U.S. Environmental Protection Agency
2013 Final Issuance of

National Pollutant Discharge Elimination System (NPDES) Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Vessels
Fact Sheet

Agency: Environmental Protection Agency (EPA)
Action: Notice of NPDES General Permit

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1. GENERAL INFORMATION

1.1. Does this Action Apply to Me?

This action is the reissuance of EPA's Vessel General Permit (VGP). The first iteration of the VGP expires on December 19, 2013. This second issuance of the VGP will replace that permit. This action applies to vessels operating in a capacity as a means of transportation, that have discharges incidental to their normal operations into waters subject to this permit, except recreational vessels as defined in Clean Water Act §502(25), P.L. 110-288. Unless otherwise excluded from coverage by Part 6 of the permit, waters subject to this permit means waters of the U.S. as defined in 40 CFR§122.2. That provision defines "waters of the U.S." as certain inland waters and the territorial sea, which extends three miles from the baseline (as used in this document, mile means nautical mile, i.e., 6076 feet).[1] Note that the Clean Water Act (CWA) does not require NPDES permits for vessels or other floating craft operating as a means of transportation beyond the territorial seas, i.e., in the contiguous zone or ocean as defined by the CWA §§ 502(9), (10). See CWA §502(12) and 40 CFR §122.2 (definition of "discharge of a pollutant"). This permit, therefore, does not apply to discharges in such waters.

Non-recreational vessels greater than 79 feet, which are not vessels of the armed forces, operating in a capacity as a means of transportation needing NPDES coverage for their incidental discharges will generally be subject to the VGP. Similarly situated vessels less than 79 feet may be covered under the VGP, or may instead opt for coverage under the Small Vessel General Permit (sVGP).

1.2. Further Information

Supporting information and materials for this permit are included in Docket ID No. EPA-HQ-OW-2011-0141-available at: www.regulations.gov.

For further information on the VGP, please send an email to vgp@epa.gov or contact Ryan Albert at (202) 564-0763 or Juhi Saxena at (202) 564-0719.

2. BACKGROUND

2.1. The Clean Water Act

Section 301(a) of the Clean Water Act (CWA) provides that "the discharge of any pollutant by any person shall be unlawful" unless the discharge is in compliance with certain other sections of the Act. 33 U.S.C. 1311(a). The CWA defines "discharge of a pollutant" as "(A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." 33 U.S.C. 1362(12). A "point source" is a "discernible, confined and discrete conveyance" and includes a "vessel or other floating craft." 33 U.S.C. 1362(14).

[1] More specifically, CWA section 502(8) defines "territorial seas" as "the belt of the seas measured from the line of the ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles."

The term "pollutant" includes, among other things, "garbage… chemical wastes…and industrial, municipal, and agricultural waste discharged into water." The Act's definition of "pollutant" specifically excludes "sewage from vessels or a discharge incidental to the normal operation of a vessel of the Armed Forces" within the meaning of CWA §312. 33 U.S.C. 1362(6).

One way a person may discharge a pollutant without violating the section 301 prohibition is by obtaining authorization to discharge (referred to herein as "coverage") under a section 402 National Pollutant Discharge Elimination System (NPDES) permit (33 U.S.C. § 1342). Under section 402(a), EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants, notwithstanding section 1311(a)" upon certain conditions required by the Act.

2.2. Legal Challenges

In December 2003, a long-standing exclusion of discharges incidental to the normal operation of vessels from the NPDES program became the subject of a lawsuit in the U.S. District Court for the Northern District of California (*Northwest Envtl. Advocates et al. v. United States EPA*, 2005 U.S. Dist. LEXIS 5373 (N.D. Cal. 2005)). On March 30, 2005, the U.S. District Court for the Northern District of California determined that the exclusion exceeded the Agency's authority under the CWA, and, in September 2006 issued a final order providing that:

> The blanket exemption for discharges incidental to the normal operation of a vessel, contained in 40 CFR 122.3(a), shall be vacated as of September 30, 2008.

Northwest Envtl. Advocates et al. v. United States EPA, 2006 U.S. Dist. LEXIS 69476 (N.D. Cal. 2006).

EPA appealed the District Court's decision to the Ninth Circuit, and on July 23, 2008, the Court upheld the decision. *Northwest Envtl. Advocates v. EPA*, 537 F.3d 1006 (9th Cir. 2008).

This meant that, effective December 19, 2008, except for those vessels exempted from NPDES permitting by Congressional legislation, discharges incidental to the normal operation of vessels which were excluded from NPDES permitting by 40 CFR 122.3(a), were subject to CWA section 301's prohibition against discharging, unless covered under an NPDES permit. The CWA authorizes civil and criminal enforcement for violations of that prohibition and also allows for citizen suits against violators.

In response to the court decisions, EPA issued the VGP in December 2008.[2] In 2009, several environmental groups, industry groups, and the State of Michigan challenged EPA's issuance of the 2008 VGP. On March 8, 2011, EPA reached settlement with the environmental groups and the State of Michigan. These settlement agreements are available in the docket for today's permit or may be obtained at: http://www.epa.gov/npdes/pubs/settlement_agreement_mi_nrdc.pdf.

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[2] Due to a subsequent extension of the vacatur date by the district court, NPDES permits were not required for VGP vessels until February 6, 2009.

EPA and the vessel industry groups challenging EPA's issuance of the 2008 VGP did not reach settlement and the litigation therefore proceeded to briefing. Among other things, Lake Carriers argued that EPA violated the Administrative Procedure Act by not providing for notice and comment at the federal level of the 401 certification conditions included in Part 6 of the 2008 VGP. EPA's position was that notice and comment at the federal level is not required because, among other things, the CWA requires the Agency to include 401 certification conditions in the VGP without modification and CWA section 401 places the requirement to obtain public input on state CWA 401 certification conditions on the certifying state agencies, not EPA. On July 22, 2011, the Court denied the petition for review, concluding that "the petitioners have failed to establish that EPA can alter or reject state certification conditions, [and therefore] the additional agency procedures they demand would not have afforded them the relief they seek." *Lake Carriers' Ass'n v. EPA*, 652 F.3d 1 at 12 (D.C. Cir. 2011).

2.3. Congressional Legislation

In late July 2008, Congress enacted two pieces of legislation to exempt discharges incidental to the normal operation of certain types of vessels from the need to obtain an NPDES permit.

The first of these, entitled the Clean Boating Act of 2008, amends the CWA to provide that discharges incidental to the normal operation of recreational vessels are not subject to NPDES permitting, and instead creates a new regulatory regime to be implemented by EPA and the U.S. Coast Guard under new 312(o) of the CWA. S. 2766, Pub. L. 110-188 (July 29, 2008). As defined in § 3 of that law, recreational vessels subject to its NPDES exclusion are any vessel that is manufactured or used primarily for pleasure or leased, rented, or chartered to a person for the pleasure of that person, but do not include a vessel that is subject to Coast Guard inspection and that is engaged in commercial use or carries paying passengers. As a result of this legislation, discharges incidental to the normal operation of recreational vessels are not subject to NPDES permitting. EPA is currently developing regulations as directed under the Clean Boating Act for recreational vessels. For more information on this action, please see: http://water.epa.gov/lawsregs/lawsguidance/cwa/vessel/CBA/about.cfm.

The second piece of legislation provides for a temporary moratorium on NPDES permitting for discharges subject to the 40 CFR 122.3(a) exclusion from (1) commercial fishing vessels (as defined in 46 U.S.C. § 2101 and regardless of size) and (2) those other non-recreational vessels less than 79 feet in length. S. 3298, Pub. L. 110-299 (July 31, 2008). The statute's NPDES permitting moratorium ran for a two-year period beginning on its July 31, 2008, enactment date, during which time EPA studied the relevant discharges and submitted a report to Congress. This moratorium was subsequently extended to December 18, 2013, by P.L. 111-215. On December 20, 2012, President Obama signed the Coast Guard and Maritime Transportation Act of 2012 , which extends the expiration date of the moratorium from December 18, 2013 to December 18, 2014. § 703 of Pub. L. 112-213. That moratorium does not include ballast water discharges. Therefore, commercial fishing vessels that are greater than 79 feet and do not have ballast water discharges will (barring further legislative action) not be required to seek coverage under the VGP until the moratorium expires on December 18, 2014. That moratorium also does not extend to other discharges, which on a case-by-case basis, EPA or the State, as appropriate, determines contribute to a violation of water quality standards or pose an unacceptable risk to human health or the environment.

EPA finalized the Report to Congress, entitled "Study of Discharges Incidental to Normal Operation of Commercial Fishing Vessels and Other Non-Recreational Vessels Less Than 79 Feet" in August 2010. That report is available at: http://cfpub.epa.gov/npdes/vessels/reportcongress.cfm and in the docket for today's permit.

2.4. General Permits

An NPDES permit authorizes the discharge of a specified amount of a pollutant or pollutants into receiving waters under certain conditions. The two basic types of NPDES permits are individual and general permits. Typically dischargers seeking coverage under a general permit are required to submit a notice of intent (NOI) to be covered by the permit. Section 3.7 of this fact sheet discusses the NOI requirements of the permit in more detail.

An individual permit is a permit specifically tailored for an individual discharger. Upon receiving the appropriate application(s), the permitting authority generally develops a draft permit for public comment for that particular discharger based on the information contained in the permit application (e.g., type of activity, nature of discharge, receiving water quality). Following consideration of public comments, a final permit may then be issued to the discharger for a specific time period (not to exceed 5 years), with a provision for reapplying for further permit coverage prior to the expiration date.

A general permit is also subject to public comment and is developed and issued by a permitting authority (in this case, EPA). A general permit covers multiple facilities within a specific category for a specific period of time (not to exceed 5 years), after which the permit expires. Like individual permits, general permits may be re-issued. Today's reissuance of the VGP includes a 5-year permit term. EPA had proposed a four year permit term, but after careful consideration of the comments on the proposed permit, EPA has finalized a five year permit term, consistent with most EPA issued NPDES permits.

Under 40 CFR 122.28, general permits may be written to cover categories of point sources having common elements, such as facilities that involve the same or substantially similar types of operations, that discharge the same types of wastes, or that are more appropriately regulated by a general permit. Given the vast number of vessels requiring NPDES permit coverage and the discharges common to these vessels, EPA believes that it makes administrative sense to issue the general permit, rather than issuing individual permits to each vessel. Courts have approved of the use of general permits. <u>See</u> e.g., *Natural Res. Def. Council v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977); *EDC v. US EPA*, 344 F.3d 832, 853 (9th Cir. 2003). The general permit approach allows EPA to allocate resources in a more efficient manner and to provide more timely coverage, particularly in light of the time constraints imposed by the Court's vacatur. As with any permit, the CWA requires the general permit to contain technology-based effluent limits, as well as any more stringent limits when necessary to meet applicable state water quality standards. State water quality standards apply in the territorial seas, defined in section 502(8) of the CWA as extending three miles from the baseline. *Pacific Legal Foundation v. Costle*, 586 F.2d 650, 655-656 (9th Cir. 1978); *Natural Resources Defense Council, Inc. v. U.S.*

EPA, 863 F.2d 1420, 1435 (9th Cir. 1988). In addition, discharges to the territorial seas are required to meet requirements to comply with section 403(c) of the CWA Ocean Discharge Criteria (40 CFR Part 125 Subpart M). As discussed in section 3.10.2 of this fact sheet, the owner/operator of a vessel, after being covered by the permit, may request to be excluded from such coverage by applying for an individual permit. In addition, EPA may subsequently require a vessel to obtain an individual permit instead of receiving coverage under the general permit.

2.5. Public Comment on EPA's Proposed VGP

EPA released the draft 2013 VGP on November 30, 2011 and allowed for a 75-day comment period after publication in the Federal Register. The public comment period closed on February 21, 2012. EPA received over 5,500 public comments on the draft permit. Comments were received from a variety of stakeholders, including industry groups, environmental stakeholders, private citizens, U.S. State governments, and international governments. These comments were used to inform decision making in finalizing this permit and EPA's responses are reflected in the response-to-comment document available in EPA Docket ID No, EPA-HQ-OW-2011-0141 at www.regulations.gov along with supporting information and other related materials.

2.6. U.S. Coast Guard Ballast Water Rulemaking

At the time the draft VGP was made available for comment in December 2011 (76 FR 76716), the USCG had proposed, but not finalized, its ballast water discharge standard and type-approval rulemaking (74 FR 44632, August 28, 2009). Since publication of the 2011 draft VGP, the USCG finalized its ballast water discharge standard and type-approval rulemaking (77 FR 77 17254, March 23, 2012). The final rule contains a number of changes from the August 2009 proposal. Readers interested in the USCG rulemaking should refer to the USCG Federal Register notices identified above for details. For the reasons described later in this fact sheet, EPA adopted some of the same changes to the draft VGP as the USGC adopted in its final rule, in particular:

- Revision of the new vessel date for compliance with the VGP's numeric technology-based ballast water discharge standards. See section 4.4.3.5.5 of this Fact Sheet for details;
- Revision of the VGP vessel applicability provisions with respect to ballast water discharge standards. See section 4.4.3.5.6 of this Fact Sheet for details; and
- Clarification of monitoring requirements for ballast water treatment systems receiving a USCG "Type Approval" or "Alternative Management System" determination under the USCG final rule. See section 4.4.3.5.1 of this Fact Sheet for details.

Additional information on the U.S. Coast Guard Ballast Water Rulemaking can be found at: http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp.

2.7. ECONOMIC IMPACTS

As discussed in the Federal Register notice announcing today's final permit, EPA performed an economic assessment of this general permit, including an examination of the economic impact this permit may have on small entities. This economic analysis is included in the docket for this permit (US EPA, 2012a). Based on this assessment, EPA concludes that despite a minimal economic impact on all entities, including small businesses, this permit will not, if issued have a significant economic impact on a substantial number of small entities.

To estimate the effect of revised permit requirements on an industry as a whole, EPA's analysis takes into account previous conditions and determines how the industry would act in the future in the absence of revised Permit requirements. The baseline for this analysis is full industry compliance with existing federal and state regulations, including the recent USCG ballast water discharge standard rule (USCG, 2012) and the 2008 VGP in the case of vessels currently covered by the permit; and current industry practices or standards that exceed current regulations to the extent that they can be empirically observed. In addition, a number of laws and associated regulations (including the National Invasive Species Act; the Act to Prevent Pollution from Ships; the Comprehensive Environmental Response, Compensation, and Liability Act; the Organotin Anti-fouling Paint Control Act; and others) already cover certain discharges that would be subject to the new permitting regime. The overlap between revised permit requirements and existing regulations and practices is discussed at greater length in the sections of the report that address each revised requirement.

EPA estimated compliance costs to commercial vessels associated with each of the permit's practices and discharge categories identified and the paperwork burden costs. Incremental costs are understood to result from the inclusion of all commercial fishing vessels 79 feet or larger under the VGP,[3] and from revised, more stringent requirements for certain discharge categories and practices. Changes in compliance costs also result from streamlining selected requirements, which is expected to reduce compliance costs for owners of certain vessels. Overall, EPA finds that revisions in the VGP requirements could result in aggregate annual incremental costs for domestic vessels ranging between $7.2 and $23.0 million (in 2010$). This includes the paperwork burden costs and the sum of all practices for applicable discharge categories for all vessels estimated to be covered by the revised VGP. The average per vessel compliance costs range between $51 and $7, 004 per vessel. Tank ships have the highest average compliance costs; this is driven by potential incremental costs for oil tankers exclusively engaged in coastwise trade that may install and operate onboard ballast water treatment systems to meet the 2013 VGP requirements applicable to ballast water discharges. There is considerable uncertainty in the assumptions used for several practices and discharge categories and these estimates therefore provide illustrative ranges of the costs potentially associated with the 2013 permit rather than incremental costs incurred by any given vessel owner.

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[3] As noted above, the moratorium on coverage for commercial fishing vessels and vessels less than 79 feet expires on December 18. 2013. Commercial fishing vessels 79 feet or larger will be covered by this permit, and most non-recreational vessels less than 79 feet, including commercial fishing vessels, are expected to be covered by the Small Vessel General Permit.

To evaluate economic impacts of revised VGP requirements on the water transportation, fishing, and mining industries, EPA performed a firm-level analysis. The firm-level analysis examines the impact of any incremental cost per vessel to comply with the revised VGP requirements on model firms that represent the financial conditions of "typical" businesses in each of the examined industry sectors. More than ninety percent of the firms in the water transportation and fishing industries, and in the drilling oil and gas wells segment of the mining industry, are small, and EPA believes it is unlikely that firm-level impacts would be significant among large firms in this industry. Therefore, a firm-level analysis focuses on assessment of impacts on small businesses. To evaluate the potential impact of the VGP on small entities, EPA used a cost-to-revenue test to evaluate the potential severity of economic impact on vessels and facilities owned by small entities. The test calculates annualized pre-tax compliance cost as a percentage of total revenues and uses a threshold of 1 and 3 percent to identify facilities that would be significantly impacted as a result of this Permit.

The total number of entities expected to exceed a 1% cost ratio ranges from 76 under low cost assumptions to 340 under high cost assumptions. Of this universe, the total number of entities expected to exceed a 3% cost ratio ranges from 5 under low cost assumptions to 30 under high cost assumptions. This is based out of 5,480 total small firms. Accordingly, EPA concludes that the VGP will not have a significant economic impact on a substantial number of small entities or other businesses.

3. THE PERMIT

Today's permit is being issued pursuant to EPA's authority to issue permits under Clean Water Act section 402. Clean Water Act section 402 and its implementing regulations contain standards that govern EPA's imposition of NPDES permit conditions. See e.g., 40 CFR Part 122 ("EPA Administered Permit Programs: The National Pollutant Discharge Elimination System"). The provisions of today's permit are established under these authorities.

3.1. GEOGRAPHIC SCOPE OF THE PERMIT

This permit is applicable to discharges incidental to the normal operation of a vessel identified in Part 1.2 of the permit and Part 3.5 of this fact sheet into waters subject to the permit, which means "waters of the U.S." as defined in 40 CFR 122.2, except as otherwise excluded by Part 6 of the permit. This includes the territorial seas, defined in section 502(8) of the CWA, extending to three miles from the baseline. *Pacific Legal Foundation v. Costle*, 586 F.2d 650, 655-656 (9th Cir. 1978); *Natural Resources Defense Council, Inc. v. U.S. EPA*, 863 F.2d 1420, 1435 (9th Cir. 1988).

The general permit will cover vessel discharges into the waters of the U.S. in all states and territories, regardless of whether a state is authorized to implement other aspects of the NPDES permit program within its jurisdiction, except as otherwise excluded by Part 6 of the permit. While, pursuant to CWA section 402(c), EPA typically is required to suspend permit issuance in authorized states, EPA may issue NPDES permits in authorized states for discharges incidental to the normal operation of a vessel because 402(c)(1) of the Clean Water Act prohibits EPA from issuing permits in authorized states only for "those discharges subject to [the state's authorized] program." Discharges formerly excluded under 40 CFR 122.3 are not "subject to" authorized state programs. The vessel discharges covered by the permit are discharges that were formerly excluded from NPDES permitting programs under 40 CFR 122.3. (See discussion of the vacatur of this exclusion in section 2.2 of this fact sheet.) Therefore the discharges at issue are not considered a part of any currently authorized state NPDES program. See 40 CFR 123.1(i)(2) (where state programs have a greater scope of coverage than "required" under the federal program, that additional coverage is not part of the authorized program) and 40 CFR 123.1(g)(1) (authorized state programs are not required to prohibit point source discharges exempted under 40 CFR122.3).

3.2. Structure of the Permit (Part 1.1)[4]

This general permit addresses vessels operating in a capacity as a means of transportation that have discharges incidental to their normal operations into waters subject to this permit, except recreational vessels and vessels of the Armed Forces. Many characteristics of vessels and vessel discharges generally apply to all vessel classes. Hence, general requirements that apply to all eligible vessels are found in Parts 1 through 4 of the permit. Part 1 of the permit contains general conditions, authorized and ineligible discharges, and explains who must file a notice of intent to receive permit coverage. Part 2 of the permit discusses effluent limits applicable to vessels. Part 3 of the permit lists required corrective actions that permittees must take to remedy deficiencies and violations. Part 4 of the permit lists visual monitoring, self-inspection, and recordkeeping and reporting requirements. Due to specific concerns arising from certain types of vessels, in Part 5 of the permit, EPA has identified select categories of vessel types that have supplemental requirements. States, territories, and certain Tribes have the authority to require additional requirements under section 401 of the CWA. Part 6 of the permit includes these additional requirements (see also Part 12 of the Fact Sheet entitled "Other Legal Requirements").

The Appendices, listed in this permit as Parts 7 through 15, include definitions, the notice of intent form, the notice of termination form, and the annual report form.

3.3. What is the Vessel Universe Affected by This Permit?

Vessels operating in a capacity as a means of transportation are eligible for coverage under the VGP. The types of vessels covered under the VGP include commercial fishing vessels, cruise ships, ferries, barges, mobile offshore drilling units, oil tankers or petroleum tankers, bulk carriers, cargo ships, container ships, other cargo freighters, refrigerant ships, research vessels, emergency response vessels, including firefighting and police vessels, and any other vessels operating in a capacity as a means of transportation. Vessels of the Armed Forces of the United States are not eligible for coverage by this permit. While all non-recreational vessels, which are not vessels of the armed forces, may seek coverage under this permit, the permit requirements are generally targeted to vessels that are at least 79 feet in length. A separate, streamlined permit is available for vessels less than 79 feet (Small Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels Less Than 79 Feet).

[4] Throughout this fact sheet, parenthetical citations in headings refer to parts of the proposed permit to serve as an aid to the reader.

EPA estimates that the domestic vessel population subject to the VGP is approximately 60,000 vessels. EPA used two existing databases (the Marine Information for Safety and Law Enforcement (MISLE) and Waterborne Transportation Lines of the United States (WTLUS) databases) to create a master database to estimate the population of domestically flagged vessels subject to the VGP. MISLE and WTLUS provided information on the number and type of domestic flag vessels subject to the Vessel General Permit. The combined database allows the Agency to obtain a comprehensive estimate of the vessel population and to minimize the number of missing data fields for any given vessel. Furthermore, EPA compared these estimates to the total number of NOIs submitted under the 2008 VGP to fact check the accuracy of these estimates. However, EPA could not use the NOI database alone to estimate the number of vessels covered by the permit as only vessels greater than 300 gross tons or with the capacity to carry more than 8 cubic meters of ballast water had to submit NOIs.

Using the Foreign Traffic Vessel Entrances and Clearances (FTVEC) database, EPA estimates approximately 12,400 foreign flagged vessels are subject to the VGP requirements. The FTVEC database provides information on foreign vessels entering or clearing U.S. Customs ports in calendar year 2008, the most recent year for which data are published (U.S. Army Corps of Engineers, 2010).

See EPA's economic analysis for the VGP for more information about the vessel universe affected (US EPA, 2011a).

3.4. Regulation of Constituents in the Discharges Under the Permit

In today's permit, EPA is establishing effluent limitations to control a variety of materials, which, for the purposes of this fact sheet, have been classified into 7 major groups: Aquatic Nuisance Species (ANS), nutrients, pathogens (including *E. coli* & fecal coliform), oil and grease, metals, most conventional pollutants (Biochemical Oxygen Demand, pH, Total Suspended Solids), and other toxic and non-conventional pollutants with toxic effects. EPA is establishing effluent limitations to control these materials, because, depending on the particular vessel, such materials are constituents in the industrial waste, chemical waste and/or garbage "pollutant" discharge resulting from the activities of these vessels. "Industrial waste," "chemical waste" and "garbage" are expressly included in the CWA's definition of "pollutant," which governs, among other things, which discharges are properly subject to CWA permitting. See CWA § 402(a) (allowing EPA to issue permits for a "discharge of any pollutant"); CWA § 502(12) (defining "discharge of a pollutant" to include "any addition of any pollutant to navigable waters from any point source"); and CWA § 502(6) (defining "pollutant" as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water" [emphasis added]). The discharge from vessels addressed in today's permit – a worthless or useless flow discharged during a vessel's normal operations – falls within those broad pollutant categories. See, e.g., Webster's II New Riverside University Dictionary (1988) (defining "waste" as "a worthless or useless by-product" or "something, such as steam, that escapes without being used"; "industrial" as "of, relating to, or derived from industry" and "industry as "the commercial production and sale of goods and services"; "chemical" as "of or relating to the action of chemicals"; and "garbage" as "worthless matter, trash").[5]

EPA understands that a lot of attention has been paid to whether, under various circumstances, ANS are properly considered "pollutants" under CWA §502(6). Today's permit controls ANS because such ANS are one constituent of concern in the waste stream that constitutes the "pollutant" subject to today's permit. See CWA § 402(a)(1)(A) and 301(b)(1) (requiring permits to include "effluent limitations") and CWA §502(11) (defining "effluent limitations" to include "restrictions established by . . . the Administrator on . . . chemical, physical, biological, and other constituents which are discharged from point sources . . ." [emphasis added]). Under these circumstances, there is no need to address the question of whether ANS in and of themselves may be considered "pollutants" under CWA section 502(6). In addition, EPA's conclusion that ANS are properly controlled in today's vessel permit does not speak as to how ANS are regulated by the CWA under any other circumstances.

Short summaries of each of the constituent types regulated in today's permit follow.

3.4.1 Aquatic Nuisance Species

Aquatic Nuisance Species (ANS), also known as invasive species, are a persistent problem in U.S. coastal and inland waters. ANS may be introduced through a variety of vectors, including ballast water and sediment from ballast tanks, chain lockers, anchor chains, and vessel hulls. These vectors have been associated with introductions of highly damaging species in the past. Though no reliable and comprehensive estimates of total ANS introductions nationwide exist, case studies of several major bodies of water across the country, as summarized in Table 1, provide a sense of the extent of the problem.

Table 1: Estimates of Invasive Species in Several Major Water Systems

Region	Estimated Rate of Invasion[1]	Estimated Total Invasions to Date
Great Lakes	No new invasions detected since 2006, prior to 2006, documented at once every 28 weeks[2]	182[2]
Mississippi River System	Unknown	100[3]
San Francisco Bay	Once every 14 weeks[4]	234[4]
Lower Columbia River Basin	Once every 22 weeks[5]	81[5]
Gulf of Mexico	Unknown	704[6]

[5] The Agency's view on what is considered "industrial waste," "chemical waste" or "garbage" as discussed in this fact sheet is limited to use of those terms in the definition of "pollutant" in the Clean Water Act and should not be considered in interpreting those or similar terms in any other statute or regulation.

Table 1: Estimates of Invasive Species in Several Major Water Systems

Region	Estimated Rate of Invasion[1]	Estimated Total Invasions to Date

[1] Ruiz and Reid (2007) suggest that these figures may not reliably represent the true rate of introduction, as they are based on discovery data, which may not always track with the underlying rate of introduction.

[2] Ricciardi 2006.

[3] USCG 2009.

[4] Cohen and Carlton 1998.

[5] Sytsma et al. 2004.

[6] Battelle 2000.

ANS pose several dangers to aquatic ecosystems, including outcompeting native species, threatening endangered species, damaging habitat, changing food webs, and altering the chemical and physical aquatic environment. Furthermore, ANS have been documented to damage recreational and commercial fisheries, infrastructure, and water based recreation and tourism.

One of the most well-known examples of ANS is the Zebra Mussel. Zebra Mussels are native to Eurasia, near the Black and Caspian Seas, and were first discovered in U.S. waters in 1988. Populations of Zebra Mussels were established in the Great Lakes and are now found throughout most of the Eastern United States and in some Western States. Zebra Mussels are filter feeders and can remove algae from the water column that other native species depend on as a food source and, therefore, Zebra Mussels outcompete native (and sometimes endangered) mollusks and other filter feeders. Zebra Mussels also damage public infrastructure and have been estimated to cause tens to hundreds of millions of dollars in losses per year to the Great Lakes alone.

Additional sources describing the presence and/or impacts of ANS and their potential invasion pathways include Barnes, 2002; Battelle, 2000; Bolch and de Salas, 2007; Brickman, 2006; Brickman and Smith, 2007; Carlton, 1985; Carlton, 1996; Carlton and Geller, 1993; Cohen and Carlton, 1998; Cohen et al., 1995; Dobbs et al., 2006; Doblin et al., 2007; Drake and Lodge, 2007; Drake et al., 2007; Johnson et al., 2001; Larson et al., 2003; Lee et al., 2010; Lockwood et al., 2005; Lovell and Stone, 2005; Lovell and Drake, 2009; NAS, 2011; Phelps, 1994; Ricciardi, 2006; Roman, 2006; Ruiz et al., 2000a; Ruiz et al., 2000b; Sakai et al., 2001; Smayda, 2007; USCG, 2009, US EPA, 2001a, and Van der Putten, 2002.

3.4.2 Nutrients

Nutrients, including nitrogen, phosphorus, and numerous micro-nutrients, are constituents of vessel discharges. Though traditionally associated with discharges from sewage treatment facilities and runoff from agricultural and urban stormwater sources, nutrients resulting from vessels are also thought to be discharged from deck runoff, vessel graywater, and vessel bilgewater, among other sources. Increased nutrient discharges from human sources are a major source of water quality degradation throughout the United States (USGS, 1999).

Nutrients are associated with a variety of negative environmental impacts, the most notable of which is eutrophication, which can lead to reduced levels of dissolved oxygen due to increased demand (sometimes to the extremes of hypoxia), reduced levels of light penetration and increased turbidity, and changes in the composition of aquatic flora and fauna, and helps to fuel harmful algal blooms (HABs), which can have significant adverse impacts on both aquatic life and human health (National Research Council, 2000, WHOI, 2007). The National Research Council (2000) found that:

- Nutrient over-enrichment of coastal ecosystems generally triggers ecological changes that decrease the biological diversity of bays and estuaries.
- While moderate nitrogen enrichment of some coastal waters may increase fish production, over-enrichment generally degrades the marine food web that supports commercially valuable fish.
- The marked increase in nutrient pollution of coastal waters has been accompanied by an increase in harmful algal blooms, and in at least some cases, pollution has triggered these blooms.
- High nutrient levels and the changes they cause in water quality and the makeup of the algal community are detrimental to the health of coral reefs and the diversity of animal life supported by seagrass and kelp communities.
- Nitrogen is the chief culprit in eutrophication and other impacts of nutrient over-enrichment in temperate coastal waters, while phosphorus is most problematic in eutrophication of freshwater lakes.
- Human conversion of atmospheric nitrogen into biologically useable forms, principally synthetic inorganic fertilizers, now matches the natural rate of biological nitrogen fixation from all the land surfaces of the earth.

Additional information discussing the sources or impacts of nutrients on aquatic ecosystems and/or their vessel based sources can be found in Copeland, 2008; Correll, 1987; Horne and Goldman, 1994; Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, 2008; NAS, 1993; US EPA, 1999; US EPA, 2001b; US EPA 2005; US EPA, 2008; and US EPA, 2010a.

3.4.3 Pathogens

Pathogens are another important constituent of discharges from vessels, particularly in graywater and potentially from ballast water discharges. Though fecal coliform is considered a conventional pollutant, it is discussed here since it shares characteristics with many other pathogens potentially discharged from vessels.

EPA's study of graywater discharges from cruise ships found that levels of pathogen indicator bacteria exceeded enterococci standards for marine water bathing and fecal coliform standards for harvesting shellfish 66% and over 80% of the time, respectively (US EPA 2008). Specific pathogens of concern found in sewage include *Salmonella* spp., *E. coli*, enteroviruses, hepatitis and pathogenic protists (National Research Council 1993), but there are multiple sources for such pathogens. Elevated levels of these pathogens have increasingly resulted in beach closures in recent years, primarily from on-shore sources such as urban stormwater runoff and sewage overflows, which in turn has reduced the recreational value of impacted beaches. Additional pathogens have been associated with ballast water discharges, including *E. coli*, *enterococci*, *Vibrio cholerae*, *Clostridium perfingens*, *Salmonella* spp. *Cryptosporidium* spp., and *Giardia* spp., as well as a variety of viruses (Knight et al. 1999; Reynolds et al. 1999; Zo et al. 1999). Johengen et al. (2005) show the potential for pathogens to be transported in ballast water tanks, even when they are not filled. The study found that virus-like particle (VLP) concentrations in sampled ballast tanks ranged from 107 to 109 per ml in residual unpumpable ballast water and from 107 to 1011 per ml in sediment porewater. Bacteria concentrations under the same conditions were 105 to 109 per ml and 104 to 108 per ml, respectively.

Though it is difficult to determine the contribution of vessel discharges to infections by these organisms it is likely that they are not a primary source. Epidemiologists have attempted to quantify the proportion of total infections that are waterborne. For example, waterborne infection may account for as many as 60% of Giardia infections and 75% of pathogenic *E. coli* infections (National Research Council 1993). Graywater discharges may be a significant source of pathogenic microorganisms within some regulated waters, and reducing graywater discharges may provide some human health benefits.

Additional information discussing pathogens, their sources, and their impacts include Dobbs et al., 2006; Knight et al., 1999; NAS, 1993; US EPA, 1999; US EPA, 2008; and US EPA 2010a.

3.4.4 Oil and Grease

Oil and grease are another known component of vessel discharges with potentially harmful impacts to humans and to aquatic life. Vessels discharge oil in every day operation, including lubricating oils, hydraulic oils, and vegetable or organic oils. A significant portion of the lubricants lost from a vessel directly enter the marine environment. Oils are highly toxic and carcinogenic, and can also taint organisms that are consumed by humans, which is a potential source of adverse health impacts. In recent years, significant research efforts have gone into the development of environmentally acceptable lubricants which would reduce environmental impact on the marine environment. Oil and grease measured by Method 1664A constitutes a conventional pollutant. Oil and grease that is commingled with other toxic pollutants may be controlled as a toxic pollutant under this permit.

Additional papers and reports discussing the impact of oil discharges, vessel based sources of these pollutants, and/or environmentally acceptable alternatives to traditional lubricants include Aluyor et al., 2009; Betton, 2009; Decola, 2000; GESAMP, 1993; GESAMP, 2007; Lucase and MacGregor, 2006; Rützler and Sterrer, 1970; Shaw et al, 1985; Suchanek, 1993; US EPA, 1999; US EPA 2010a; and Wiese and Ryan, 2003.

3.4.5 Metals

Metals are a diverse group of pollutants, many of which are toxic to aquatic life and humans. Vessel discharges can contain a variety of metal constituents which can come from a variety of on-board sources. For example, EPA's study of cruise ship graywater found a total of 13 different metals in at least 10% of samples, with copper, nickel and zinc detected in 100% of samples (US EPA, 2008). Bilgewater has also been shown to contain numerous metals, the exact constituents of which vary dependent upon on-board activities on the vessel and the materials used in the construction of the vessel. Other metals, such as copper, are known to leach from vessel hulls and can cause exceedances of water quality standards. For example, Srinivasan and Swain (2007) found significant leaching of copper from the hulls of sailboats, powerboats, and cruise ships.

While some metals, including copper, nickel and zinc, are known to be essential to organism function, many others, including thallium and arsenic, are non-essential and/or are known to have only adverse impacts. Even essential metals can do serious damage to organism function in sufficiently elevated concentrations. Adverse impacts can include impaired organ function, impaired reproduction and birth defects, and, at extreme concentrations, acute mortality. For example, Katranitsasa et al. (2003) noted that the copper released from copper anti-fouling paints are toxic to non-targeted aquatic organisms. Additionally, through a process known as bioaccumulation, metals may not be fully eliminated from blood and tissues by natural processes, and may accumulate in predator organisms further up the food chain, including commercially harvested fish species (US EPA, 2007e).

Additional sources discussing the impacts of metals on the aquatic environment and/or their vessel-based sources include Axiak et al., 1995; Trocine and Trefry, 1996; US EPA, 1999; and US EPA, 2010a.

3.4.6 Toxic and Non-Conventional Pollutants with Toxic Effects

The term "toxic and non-conventional pollutants with toxic effects," as it applies to constituents of vessel discharges, encompasses a variety of chemical compounds known to have a broad array of adverse impacts on aquatic species and human health. For example, EPA's study of cruise ship graywater found a total of 17 different volatile and semi-volatile organic compounds in at least 10% of samples, for which the most significant rates and levels of detection were phthalates, phenol, and tetrachloroethylene. Other notable toxics detected in incidental discharges from vessels include free residual chlorine and chlorides and perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) found in some firefighting foam (AFFF).

These compounds can cause a variety of adverse impacts on ecosystems and living marine resources, including fisheries. Phthalates are known to interfere with reproductive health, liver and kidney function in both animals and humans (Sekizawa et al., 2003; DiGangi et al., 2002). Chlorine, though toxic to humans at high concentrations, is of much greater concern to aquatic species, which can experience respiratory problems, hemorrhaging, and acute mortality even at relatively low concentrations (US EPA, 2008). PFOS and PFOA, potentially found in AFFF discharges, are persistent, bioaccumulative, toxic and carcinogenic chemical compounds. The health impacts of PFOA and its telomeres are not entirely understood, particularly in aquatic environments, but EPA's Science Advisory Board has concluded that PFOA "is likely to be carcinogenic in humans" (SAB, 2006).

3.4.7 Other Non-Conventional and Conventional Pollutants (Except Fecal Coliform)

The category "other non-conventional and conventional pollutants" as applied to vessel discharges also consists of multiple pollutants with disparate impacts. Discharges of graywater, bilgewater, seawater cooling overboard, and other vessel waste streams or effluent can include pollutants that affect pH, add heat, and/or increase turbidity or discharge suspended sediment.

Some vessel discharges are more acidic or basic than the receiving waters, which can have a localized effect on pH (ADEC, 2007). Though no research has been done linking vessel pollution specifically to pH impacts on aquatic ecosystems, extensive literature on the impacts of pH changes in the contexts of aquaculture and acid rain does exist. For nearly all fish populations, pH more acidic than 5 or more basic than 10 will cause rapid mortality. In addition, many individual species are sensitive to more moderate changes in pH (Wurts and Durborrow, 1992).

Some vessel discharges may also affect temperature locally (Battelle, 2007). Thermal impacts of vessel discharges are generally much smaller than those from better known sources such as dams, power plant cooling water, and runoff. However, even small temperature changes can impact some sensitive organisms' growth, reproduction, and even survival, which implies that some vessel discharges may have localized adverse impacts on aquatic organisms (Abbaspour et al., 2005; Cairns, 1972; Govorushko, 2007).

Some vessel discharges, such as those from ballast water and bilgewater, can contain suspended sediments and have elevated turbidity. Loadings of sediment from vessel discharges are likely much smaller than from other sources such as construction, urban stormwater, and agriculture. The most significant sources of sediment from vessel discharges likely come from areas in the vessel where water is held, sediment settles out of solution and accumulates over time, and then is later periodically resuspended before discharging.

Designated uses such as navigation, drinking water, recreation, and agriculture are impaired by excess suspended sediments (US EPA, 2003). When sediments diminish water quality to support aquatic life, other human uses of the same waterbodies such as recreational or commercial fishing may also be diminished. Furthermore, there is evidence that aquatic life uses are one of the most sensitive endpoints to alterations in sediment loading. Direct effects on invertebrates and fish are complex, ranging from behavioral to physiological to toxicological. Suspended sediments have been documented to have a negative effect on the survival of fish, freshwater mussels, and other benthic organisms. In a frequently cited review paper prepared by Newcombe and Jensen (1996), sublethal effects (e.g. increased respiration rate) were observed in eggs and larvae of salmonids and nonsalmonids, as well as in adult estuarine and freshwater nonsalmonids, when exposed to Total Suspended Solids concentrations as low as 55 mg/L for one hour. Mussels compensate for increased levels of suspended sediment by increasing filtration rates, increasing the proportion of filtered material that is rejected, and increasing the selection efficiency for organic matter. Excess sediment smothers benthic organisms and the surface layer of the benthos can be heavily impacted and altered. Increased turbidity associated with suspended sediments can reduce primary productivity of algae as well as growth and reproduction of submerged vegetation (Jha, 2003). In addition, once in the system, resuspension and deposition can "recycle" sediments so that they exert water column and benthic effects repeatedly over time and in multiple locations.

3.5. COVERAGE UNDER THE PERMIT

3.5.1 Eligibility (Part 1.2)

Vessels Not Eligible for Coverage

Recreational vessels and vessels of the United States Armed Forces are not eligible for coverage under this permit. Non-recreational vessels less than 79 feet in length, which are not vessels of the armed forces, may obtain coverage under this permit, or they may obtain coverage under EPA's small Vessel General Permit (sVGP). This flexibility may be useful for vessel owner/operators who manage vessels that are both larger and smaller than 79 feet, and would prefer to manage their fleet using the same permit. If auxiliary vessels or craft, such as lifeboats or rescue boats on-board larger vessels require permit coverage, they are eligible for coverage under this permit and are covered by submission of the Notice of Intent for the larger vessels.

Vessel Discharges Eligible for Coverage

The discharges eligible for coverage under the permit are those discharges incidental to the normal operation of a vessel covered by the exclusion in 40 CFR 122.3(a) prior to vacatur of that exclusion. Discharges incidental to normal operation include deck runoff, bilgewater, and ballast water. Some potential discharges are not incidental to the normal operation of a vessel. For example, intentionally adding used motor oil to the bilge tank will result in a discharge that is not incidental to the normal operation of a vessel. Furthermore, any discharge that results from a failure to properly maintain the vessel and equipment, even if the discharge is of a type that is otherwise covered by the permit, is not eligible for permit coverage. Discharges that are neither covered by this permit nor the sVGP, and are not exempt from section 402 of the Clean Water Act, must be covered under a separate individual or general permit.

The discharges that were selected for coverage under the permit have been identified by EPA, in consultation with other Federal agencies, as discharges incidental to the normal operation of a vessel. EPA has relied on the most accurate and up-to-date information available. Sources used include those in the bibliography of this fact sheet and in the docket for this permit.

The following list identifies and describes each effluent stream eligible for coverage under the permit.

3.5.1.1 Deck Washdown and Runoff and Above Water Line Hull Cleaning

Deck washdown and runoff occurs from all vessels as a result of precipitation or deck cleaning. Above water line hull cleaning discharges occur when areas of the hull or other exterior portions of the vessel undergo regular cleaning. The constituents can include detergent, soap, and residues from any on-deck or above water line hull cleaning activity. Constituents and volumes of deck runoff vary widely and are highly dependent on a vessel's purpose, service, and practices. Deck runoff and above water line hull cleaning discharges eligible for coverage under the permit include those from all deck and bulkhead areas, associated equipment, and areas of the hull and exterior of the vessel above the water line.

3.5.1.2 Bilgewater

Bilgewater consists of water and other residue that accumulates in a compartment of the vessel's hull. The source of bilgewater is typically drainage from interior machinery, engine rooms, and from deck drainage. Constituents of bilgewater include seawater, oil, grease, volatile and semi-volatile organic compounds, inorganic salts, and metals.

3.5.1.3 Ballast Water

Ballast water is water taken on-board into ballast water tanks, and assists with vessel draft, buoyancy, and stability. Ballast water tanks are typically found only on commercial vessels. Discharge volumes and rates vary by vessel type, ballast tank capacity, and type of deballasting equipment. Typical cruise ships have a ballast capacity of 1,000 cubic meters (approximately 264,000 gallons) of water and can discharge at 250-300 cubic meters per hour. Cargo ships carry anywhere from 2,900 cubic meters (approximately 766,000 gallons) to 93,000 cubic meters (approximately 24,568,000 gallons) of water. Ballast water may contain rust inhibitors, flocculent compounds, epoxy coating materials, zinc or aluminum (from anodes), iron, nickel, copper, bronze, silver, and other material or sediment from inside the tank, pipes, or other machinery. Ballast water may also contain marine organisms that originate where the water is collected. When transported to non-native waters, these organisms may upset the environment or food web as "invasive species."

3.5.1.4 Anti-Fouling Leachate from Anti-Fouling Hull Coatings

Vessel hulls are often coated with antifouling compounds to prevent or inhibit the attachment and growth of aquatic life. Coatings are formulated for different conditions and purposes and many contain biocides. Those that contain biocides prevent the attachment of aquatic organisms to the hull by continuously leaching substances that are toxic to aquatic life into the surrounding water. While a variety of different ingredients may be used in these compounds, the most commonly used is copper. Copper can inhibit photosynthesis in plants and interfere with enzyme function in both plants and animals in concentrations as low as 4 μg/l. Additional releases of these substances are caused by hull cleaning activities, particularly if hulls are cleaned within the first 90 days following application.

A second metal-based biocide is organotin based, typically tributyltin (TBT), which was historically applied to vessel hulls. Due to its acute toxicity, there will be a zero discharge standard for TBT or any other organotin compound under this permit (EPA notes that the discharge of TBT is also prohibited by other domestic statutes and an international treaty, see additional discussion in section 4.4.4 for additional discussion). TBT and other organotins cause deformities in aquatic life, including deformities that disrupt or prevent reproduction. Numerous studies and several peer reviewed publications (Bentivegna & Piatkowski, 1998; Haynes & Loong, 2002; Negri et al., 2004; Negri & Heyward, 2001; Ruiz et al., 1995; V. Axiak et al., 1995) examine the environmental impacts of anti-foulant paint leachate containing TBT. TBT and other organotins are also stable and persistent, resisting natural degradation in water bodies.

3.5.1.5 Aqueous Film Forming Foam (AFFF)

AFFF is a synthetic firefighting agent consisting of fluorosurfactants and/or fluoroproteins. It serves as an effective firefighting agent by forming an oxygen-excluding barrier over an area. In order to produce AFFF, a concentrated solution of the foam forming agent is injected into the water stream of a fire hose. Vessels equipped with AFFF equipment must periodically (annually or semi-annually) test the equipment for maintenance, certification, or training purposes resulting in discharge overboard or onto the deck.

3.5.1.6 Boiler/Economizer Blowdown

Boiler blowdown occurs on vessels with steam propulsion or a steam generator to control anti-corrosion and anti-scaling treatment concentrations and to remove sludge from boiler systems. The blowdown involves releasing a volume of 1% – 10% of water from the boiler system, usually below the waterline.

3.5.1.7 Cathodic Protection

Vessels use cathodic protection systems to prevent steel hull or metal structure corrosion. The two types of cathodic protection are sacrificial anodes and impressed current cathodic protection (ICCP). Using the first method, anodes of zinc or aluminum are “sacrificed” to the corrosive forces of the seawater, which creates a flow of electrons to the cathode, thereby preventing the cathode from corroding. These sacrificial metals are then released to the aquatic environment. Using ICCP, a DC electrical current is passed through the hull such that the electrochemical potential of the hull is sufficiently high enough to prevent corrosion.

3.5.1.8 Chain Locker Effluent

Chain locker effluent is water that collects in the below-deck storage area during anchor retrieval. A sump collects the liquids and materials that enter the chain locker and discharges it overboard or into the bilge. Chain locker effluent can contain marine organisms and residue such as rust, paint chips, grease, and zinc. When transported to non-native waters, these organisms may upset the environment or food web as “invasive species.”

3.5.1.9 Controllable Pitch Propeller and Thruster Hydraulic Fluid and other Oil to Sea Interfaces including Lubrication discharges from Paddle Wheel Propulsion, Stern Tubes, Thruster Bearings, Stabilizers, Rudder Bearings, Azimuth Thrusters, Propulsion Pod Lubrication, and Wire Rope and Mechanical Equipment Subject to Immersion

Oil-to-sea interfaces include any mechanical or other equipment where seals or surfaces may release small quantities of oil into the sea. Examples include controllable pitch propellers (CPPs). CPPs are variably-pitched propeller blades used to change the speed or direction of a vessel and are used in addition to the main propulsion system. Hydraulic oil can leak from the CPP if the protective seals are worn or defective and large amounts may be discharged into surrounding waters during maintenance and repair. Another example includes rudder bearings, which allow a vessel’s rudder to turn freely and can be either grease-, oil-, or water-lubricated. An additional example is the stern tube. The stern tube is the casing or hole through the hull of the vessel through which the propeller shaft connects the engine of the vessel to the propeller.

The propeller shaft and its supporting bearings require lubrication oil. Discharges can occur due to the design of the interface or if the protective seals or bearings are not maintained and develop leaks or if they are damaged. Yet another example would be wire ropes and cables that have lubricated surfaces which contact the sea.

The impact of lubricant discharges (not accidental spills) to the marine ecosystem is substantial. The majority of ocean-going ships operate with oil-lubricated stern tubes and use lubricating oils in a large number of applications in on-deck and underwater (submerged) machinery. The issue of oil leakage from stern tubes, once considered a part of normal "operational consumption" of oil, has become an issue of wide concern and is now being treated as oil pollution. Stern tube leakage is a significant source of lubricant oil inputs to the marine environment. A 2001 study commissioned by the European Commission DG Joint Research Centre (Pavlakis et al., 2001) concluded that routine unauthorized operational discharges of oil from ships into the Mediterranean Sea created more pollution than accidental spills.

An analysis of data on oil consumption sourced from a lubricant supplier indicated a range of average daily stern tube lubricant consumption rates for different vessels (Etkin, 2010). The average rate across vessel types was 2.6 liters per day, but ranged from less than 1 liter per day to 20 liters per day. In addition to spills and stern tube leakage, there are "operational inputs" of lubricant oils that occur due to continuous low-level discharges and leakages that occur during normal vessel operations in port. The sources of operational discharges include deck machinery and in-water (submerged) machinery. There are a number of systems situated below the waterline which must be lubricated, such as the stern tube bearing, thruster gearboxes, and horizontal stabilizers. All of these have pressurized lubricating oil mechanisms that maintain a pressure higher than the surrounding sea. This ensures that no significant amount of seawater can enter the oil system, where it would compromise the unit's reliability. Any leakage of lubricant oil which does take place will be into the surrounding waters.

Etkin (2010) estimated the marine inputs of lubricant oils within the 4,708 ports and harbors of the world through stern tube leakage and operational discharges from marine shipping. Her results indicate that commercial vessels make over 1.7 million vessel port visits each year, and leak 4.6 to 28.6 million liters of lubricating oil from stern tubes. In addition, 32.3 million liters of oil enters marine waters from other operational discharges and leaks. In total, operational discharges (including stern tube leakage) add between 36.9 million liters and 61 million liters of lubricating oil into marine port waters annually.

3.5.1.10 Distillation and Reverse Osmosis Brine

Discharges of brine can occur from on-board plants that distill seawater or utilize reverse osmosis (RO) to generate fresh water. Distillation effluent may be at elevated temperatures and may contain anti-scaling treatment, acidic cleaning compounds, or metals. RO effluent is concentrated brine.

3.5.1.11 Elevator Pit Effluent

Large vessels with multiple decks are equipped with elevators to facilitate the transportation of maintenance equipment, people, and cargo between decks. A pit at the bottom of the elevator shaft collects liquids and debris from elevator operations, and may include oil and hydraulic fluid. Pits can be emptied by gravity draining, discharged using the firemain, transferred to bilge, or containerized for onshore disposal.

3.5.1.12 Firemain Systems

Firemain systems draw in water through the sea chest to supply water for fire hose stations, sprinkler systems, or AFFF distribution stations. Firemain stations can be pressurized or non-pressurized and are often used for secondary purposes onboard vessels (e.g., deck and equipment washdowns, machinery cooling water, ballast tank filling). However, when used for secondary purposes that result in other incidental discharges listed in the permit, that discharge is regulated by the relevant effluent limitation associated with that activity (e.g., rinsing off the anchor chain).

3.5.1.13 Freshwater Layup

Seawater cooling systems condense low pressure steam from propulsion plant or generator turbines on some vessels. When a vessel is pierside or in port for more than a few days, the main steam plant is shut down and the condensers do not circulate. This can cause an accumulation of biological growth within the system; consequently, a freshwater layup is carried-out by replacing the seawater in the system with potable or surrounding freshwater (e.g., lake water). The freshwater remains stagnant for two hours before being blown overboard using pressurized air. After this, the condensers are considered flushed and are then refilled for the actual layup. After 21 days this fillwater is discharged and replaced and this is done on a 30-day cycle thereafter. Freshwater layup discharges residual saltwater, freshwater, tap water, and metals leached from the pipes or machinery into the environment.

3.5.1.14 Gas Turbine Water Wash

Gas turbines are used for propulsion and electricity generation. Occasionally, they must be cleaned to remove by-products that can accumulate and affect their operation. These by-products include salts, lubricants, and combustion residuals. The wastewater from the cleaning process may include cleaning compounds as well.

3.5.1.15 Graywater

Graywater is water from showers, baths, sinks, and laundry facilities. Graywater can contain high levels of pathogens, nutrients, soaps and detergents, and organics. Untreated graywater is much more likely to cause environmental impact when it is generated in large volumes (e.g., from cruise ships). Some vessels have the capacity to collect and store graywater for later treatment and discharge. Those that do not have graywater holding capacity continuously discharge it to receiving waters.

It is important to note that there is a small category of graywater discharges that are not subject to the CWA's NPDES permitting requirement and thus are not covered by today's permit. As discussed in section 3.5.2.2 below, discharges of sewage from vessels are not subject to the CWA's NPDES permitting requirements, and are thus are not addressed by the VGP. 33 U.S.C. 1322(a)(6); 33 U.S.C. 1362(6). Instead, these discharges are regulated under a separate regulatory scheme: section 312 of the Clean Water Act. Under Clean Water Act section 312, the definition of "sewage" includes graywater discharges from "commercial vessels" (as defined at 33 U.S.C. 1322(a)(10)) on the Great Lakes. Thus, graywater discharges from such vessels are regulated under section 312 of the Clean Water Act, not this permit. 33 U.S.C. 1322(a)(6).

3.5.1.16 Motor Gasoline and Compensating Discharge

Motor gasoline is transported on vessels to operate vehicles and other machinery. As the fuel is used, ambient water is added to the fuel tanks to replace the weight. This ambient water is discharged when the vessel refills the tanks with gasoline or when performing maintenance and can contain residual oils. Most vessels are designed not to have motor gasoline and compensating discharge.

3.5.1.17 Non-Oily Machinery Wastewater

Non-oily machinery wastewater systems are intended to keep wastewater from machinery that contains no oil separate from wastewater that has oil content. Vessels can have numerous sources of non-oily machinery wastewater, including distilling plants start-up discharge, chilled water condensate drains, fresh and saltwater pump drains, potable water tank overflows, and leaks from propulsion shaft seals.

3.5.1.18 Refrigeration and Air Condensate Discharge

Condensation from cold refrigeration or evaporator coils of air conditioning systems drips from the coils and collects in drip troughs which typically channel to a drainage system. Condensate discharge may contain detergents, seawater, food residue, and trace metals.

3.5.1.19 Seawater Cooling Overboard Discharge (Including Non-Contact Engine Cooling Water, Hydraulic System Cooling Water, Refrigeration Cooling Water)

Seawater cooling systems use ambient water to absorb the heat from heat exchangers, propulsion systems, and mechanical auxiliary systems. The water is typically circulated through an enclosed system that does not come in direct contact with machinery, but still may contain sediment from water intake, traces of hydraulic or lubricating oils, and trace metals leached or eroded from the pipes within the system. Additionally, because it is used for cooling, the effluent will have an increased temperature.

3.5.1.20 Seawater Piping Biofouling Prevention

Vessels that utilize seawater cooling systems introduce anti-fouling compounds (e.g., sodium hypochlorite) in their interior piping and component surfaces to inhibit the growth of fouling organisms. These anti-fouling compounds are then typically discharged overboard.

3.5.1.21 Boat Engine Wet Exhaust

Large vessels covered by the permit often have several small boats on-board. Small boat engines use ambient water that is injected into the exhaust for cooling and noise reduction purposes. This wet engine exhaust can contain numerous pollutants when discharged.

3.5.1.22 Sonar Dome Discharge

Water is used to maintain the shape and pressure of domes that house sonar detection, navigation, and ranging equipment. Discharges occur when the water must be drained for maintenance or repair or from the exterior of the sonar dome.

3.5.1.23 Underwater Ship Husbandry and Hull Fouling Discharges

Underwater ship husbandry is grooming, maintenance, and repair activities of hulls or hull appendages completed while the vessel is located in the water, including hull cleaning (such as removal of fouling organisms), hull repair, fiberglass repair, welding, sonar dome repair, non-destructive testing, masker belt repairs, and painting operations. Underwater ship husbandry discharges are considered incidental to the normal operation of a vessel when ships are maintained in proper operating order and the cleaning is done on a reasonable schedule. For drydock and other large cleaning activities, once every few years may be considered a reasonable schedule.

3.5.1.24 Welldeck Discharges

The welldeck is a floodable platform used for launching or loading small satellite vessels, vehicles, and cargo. Welldeck discharges may include water from precipitation, welldeck and storage area washdowns, equipment and engine washdowns, and leaks and spills from stored machinery.

3.5.1.25 Graywater Mixed with Sewage from Vessels

Depending on how the vessel is designed, graywater and sewage may be combined into one effluent stream. Discharges of graywater that contain sewage are eligible for coverage under this permit (except for commercial vessels in the Great Lakes as discussed above) and must meet the discharge limitation requirements under Part 2, as well as any requirements applicable to sewage discharges (i.e., 33 U.S.C. §§ 1322(a)-(m) and the implementing regulations at 40 CFR Part 140 and 33 CFR Part 159), although these are not contained in this permit.

3.5.1.26 Exhaust Gas Scrubber Washwater Discharge

Exhaust gas scrubber washwater discharge (EGS washwater discharge) occurs as a result of operating or cleaning the exhaust gas cleaning systems (e.g. scrubbers) for marine diesel engines. After the washing solution is returned from the scrubber, the washwater can be either treated and discharged overboard, or alternatively, it can be piped to a clean bilge water tank or other suitable holding tanks. While many of the captured contaminants (sludge) are transferred to the vessel's sludge tank, the constituents of EGS washwater discharge can include residues of nitrogen oxides (NO_x), sulfur oxides (SO_x) and particulate matter (PM) emissions captured by the scrubbers. EGS washwater discharge can also contain traces of oil, polycyclic aromatic hydrocarbons (PAHs), heavy metals and nitrogen. Depending on the geographic location of the EGS washwater discharge, the pH level and turbidity of the receiving water may be altered.

3.5.1.27 Fish Hold Effluent

Fish hold effluent is composed of seawater, ice-melt, or ice slurry collected inside fish hold tanks. Fish hold effluent contains pollutants which result from seafood catch and other on-board vessel sources. These pollutants can include biological wastes, metals, nutrients, and wastewater resulting from fish hold cleaning activities. For vessels with refrigerated seawater tanks, fish are typically extracted using a vacuum system that removes both the fish and refrigerated seawater simultaneously. Any excess refrigerated seawater that is not required to assist in fish extraction is typically pumped overboard. Vessels that use chipped or slurry ice generally remove the seafood and then discharge the spent ice overboard. Tanks used to keep lobster and crab catch alive pump surrounding water into the tank constantly to maintain the highest water quality possible. The flow rate through these systems results in a nearly continuous discharge of fish hold effluent.

Fish holds are also often cleaned or disinfected by vessel crews between catches. To rinse the tank, vessel crews use either municipal water from the pier or dock or they pump water from the surrounding ambient water. Cleaning may simply involve rinsing the tanks with this water or a thorough scrub down with the addition of detergents or disinfectants to maximize the removal of organic material. As a result, the effluent from fish hold cleaning contains a combination of residual fish hold water and ambient or municipal water and often contains soaps or detergents. For more information discussing fish hold effluent, including information regarding specific constituents contained within that discharge, please see EPA's 2010 vessels report to Congress available at www.epa.gov/npdes/vessels (US EPA, 2010a) and in the docket for today's permit.

3.5.2 Discharge Types Specifically Not Authorized By This Permit

EPA has identified several discharge types that would not be authorized by this permit because, among other things, the discharge is not within the scope of the current 40 CFR 122.3(a) exclusion or not within the scope of EPA's NPDES permitting authority.

3.5.2.1 Discharges Not Subject to Former NPDES Permit Exclusion Including Vessels Being Operated in a Capacity Other than as a Means of Transportation

Any discharge that was not subject to the former regulatory exclusion as of December 18, 2008, would not be authorized under the current permit. The date of December 18, 2008 is the day before the date of the vacatur of the regulatory exclusion.

The regulatory exclusion did not apply when the vessel is operating in a capacity other than as a means of transportation, and therefore, discharges from such vessels continue to be ineligible for coverage under this permit. Vessels that are not being operated in the capacity of a means of transportation include vessels being used as energy or mining facilities, storage facilities, seafood processing facilities, or vessels that are secured to a storage facility or a seafood processing facility, or when secured to the bed of the ocean, contiguous zone, or water of the United States for the purpose of mineral or oil exploration or development. Similarly, vessels, when in drydock, also do not operate in a capacity as a means of transportation. Vessels that operate in a capacity other than as a means of transportation generally have not been excluded from NPDES permitting under 40 CFR Part 122.3(a).

"Floating" craft that are permanently moored to their piers, such as "floating" casinos, hotels, restaurants, bars, etc. are not covered by the current vessel exclusion and thus would not be covered by the vessel permit. These structures are outside the scope of the 40 CFR Part 122.3(a) exclusion because they operate "in a capacity other than as a means of transportation." They are best characterized as casinos, hotels, restaurants, bars, etc. that happen to be located on water instead of land, much like, for example, the water-based storage facilities mentioned in 122.3(a) as being outside the scope of the exclusion.

With respect to vessels under construction, when the vessel is engaged in sea trials which result in operational discharges, because testing is a critical part of vessel operation, such discharges would be incidental to the normal operation of a vessel, and thus eligible for coverage under this VGP. However, any discharges resulting from construction activities are not covered by the VGP as they are incidental to vessel construction, not vessel operation. With respect to vessels engaged in dredging operations, the resulting discharges of dredged or fill material generated by their dredging activity is covered by a CWA § 404 permit or MPRSA ocean dumping permit, and such discharges are excluded from CWA § 402 permitting. The incidental discharges (e.g., graywater, bilgewater) coming from the dredging vessels themselves are eligible for coverage under this permit (because they move as they dredge and thus are still operating as a means of transportation).

3.5.2.2 Sewage from Vessels

The definition of "pollutant" in the Clean Water Act 502(6)(A) specifically excludes "'sewage from vessels' within the meaning of [Section 312 of the Clean Water Act]." These discharges are instead regulated under section 312 of the CWA.

3.5.2.3 Used or Spent Oil

The discharge of used or spent oil no longer being used for its intended purpose is not eligible for coverage under the permit. Also prohibited is the discharge of used or spent oil by adding it to a discharge stream that is otherwise eligible for coverage under the permit.

Discharges of small amounts of oil incidental to the normal operation of a vessel are permissible provided appropriate effluent limits are met, including that oil is not discharged in quantities that may be harmful, pursuant to 40 CFR Part 110.3. See the discussion of limitations for specific waste streams in Part 4 of this fact sheet below.

3.5.2.4 Rubbish, Trash, Garbage or Other Materials Discharged Overboard

Rubbish, trash, garbage or other materials discharged overboard are not eligible for coverage under the permit because such materials are not subject to the 40 CFR 122.3(a) exclusion. As stated in VGP Part 1.2.3.4, "garbage" includes bulk dry cargo residues, as defined by USCG regulations (33 CFR Part 151, Subpart A (see 73 Fed. Reg. 56492 (September 29, 2008)) and agricultural cargo residues (e.g., residue from agricultural cargo carried in bulk, such as corn, wheat, rice, soybeans, and grains (see H. Rept. 107-777 at pg 90 (November 13, 2002)), Thus discharges of such residues are outside the scope of this permit.

3.5.2.5 Photo Processing Waste

Photo processing waste includes a wide variety of compounds, such as ammonia, sulfuric acid, and silver. It is not eligible for coverage under the permit; it is generated in small quantities and can be held for proper disposal onshore.

3.5.2.6 Effluent from Dry Cleaning Operations

Tetrachloroethylene, also known as perchloroethylene, or PERC, is a highly toxic substance primarily used by the dry cleaning industry. When humans are exposed to tetrachloroethylene it can cause dizziness, headache, nausea, nervous system problems, unconsciousness, and death. It is a probable human carcinogen. Tetrachloroethylene is toxic at low levels and can contaminate soil and water. Tetrachloroethylene discharges associated with dry-cleaning activities on vessels are not eligible for coverage under the permit because they are not incidental to the normal operation of a vessel.

3.5.2.7 Discharges of Medical Waste and Related Materials

The discharge of medical waste as defined in 33 U.S.C. 1362(20), spent or unused pharmaceuticals, formaldehyde or other biohazards no longer being used for their intended purposes are not eligible for coverage under this permit. EPA considers these discharges as not being subject to the NPDES permit exclusion. For purposes of this permit, the liquid produced by dialysis treatment of humans is not deemed to be "medical waste," and, like other human body waste (i.e., sewage), is exempt from NPDES permitting under 33 U.S.C. 1362(6). Like other sewage, this liquid is regulated, however, under VGP Part 2.2.25 if added to a blackwater system combined with a graywater system and is otherwise subject to the requirements of 33 U.S.C 1322 and its implementing regulations. The direct overboard discharge of such liquid without treatment is not authorized by the VGP.

3.5.2.8 Discharges of Noxious Liquid Substance (NLS) Residues

The permit does not authorize the discharges of noxious liquid substance (NLS) residues subject to 33 CFR Part 151, Subpart A, or 46 CFR 153.1102. Under 46 CFR 153.1102, discharges of NLS residues are either prohibited or, if allowable, may only take place at sea at least 12 nautical miles from the nearest shore. In light of this, the permit does not authorize such discharges within waters subject to the permit (i.e., inland waters and the waters of the 3 mile territorial sea). The relevant Coast Guard definition of the term "noxious liquid substance" (see 46 CFR 153.2) is set out in the definition section of the permit.

3.5.2.9 Tetrachloroethylene (Perchloroethylene) and Trichloroethylene (TCE) Degreasers or Other Products Containing Tetrachloroethylene and Trichloroethylene

Any degreasers containing tetrachloroethylene or trichloroethylene (TCE) are not authorized for discharge into waters subject to this permit. Both tetrachloroethylene and trichloroethylene are considered probably carcinogenic to humans and both are priority pollutants. In developing the 2008 VGP, EPA compared the cost of tetrachloroethylene or TCE degreasers to products not containing tetrachloroethylene or TCE and determined that other viable products are available and use of those products is economically practicable and achievable (ABT, 2008). Alternatives to trichloroethylene degreasing products include alkaline aqueous solutions and semi-aqueous solutions.

3.5.2.10 Discharges Currently or Previously Covered by Another NPDES Permit

Any vessel discharge that is currently or has previously been covered by either an individual NPDES permit or another general NPDES permit is not eligible for coverage under the permit, without written permission from EPA. The vessel general permit is not intended to supplant or replace any current or previous NPDES permit.

3.6. PERMIT COMPLIANCE (PART 1.4)

Part 1.4 of the permit is intended to inform the permittee of the potential consequences of failure to comply with the conditions of the permit. Part 1.4 explains that any failure to comply with the conditions of the permit constitutes a violation of the Clean Water Act. Also applicable to all permittees is the standard NPDES permit condition for the "duty to comply" (see 40 CFR 122.41(a)). Where requirements and schedules for taking corrective actions are included, the time intervals are not grace periods, but are schedules considered reasonable for making repairs and improvements. For provisions specifying a time period to remedy noncompliance, the initial failure, such as a violation of a numeric or non-numeric effluent limit, constitutes a violation of the VGP and the Clean Water Act (unless specifically otherwise stipulated), and subsequent failure to remedy such deficiencies within the specified time periods constitutes an independent, additional violation of the permit and the CWA.

EPA notes that the U.S. Coast Guard and U.S. EPA signed a Memorandum of Understanding (MOU) to better coordinate efforts to implement and enforce VGP requirements for vessels. Under the MOU, the two agencies will share information, expertise, and provide technical assistance on implementing and enforcing the VGP, which will help reduce government redundancy and enable each agency to accomplish its missions more effectively. Additionally, the USCG will assist with verifying compliance of the VGP for domestic and foreign vessels. To view a copy of the MOU, please visit http://epa.gov/compliance/resources/agreements/cwa/mou-coastguard-vesselpermitrequirements.pdf.

A copy of the February 11, 2011 Coast Guard policy letter entitled "Guidelines for Coast Guard Evaluations of Compliance with U.S. Environmental Protection Agency's (EPA) Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Vessels" can be found in the docket for today's permit.

3.7. AUTHORIZATION UNDER THE PERMIT (PART 1.5)

3.7.1 No Requirement to Submit a Notice of Intent (NOI) for Certain Vessels

Under 40 CFR § 122.28 (b)(2)(v), some dischargers may, at the discretion of the Director, "be authorized to discharge under a general permit without submitting a notice of intent where the Director finds that a notice of intent requirement would be inappropriate." In making such a determination, the Director must consider: the type of discharge; the expected nature of the discharge; the potential for toxic and conventional pollutants in the discharges; the expected volume of the discharges; other means of identifying discharges covered by the permit; and the estimated number of discharges to be covered by the permit. Based on consideration of these regulatory factors, EPA is exercising its discretion and not requiring operators of certain vessels to submit NOIs: namely, those that are smaller than 300 gross tons, and do not have the capacity to carry more than 8 cubic meters (2113 gallons) of ballast water. The reasons for this approach are explained below:

EPA estimates that there are approximately 72,000 vessels that may be covered by the permit. To require all these vessels to submit an NOI would be a large administrative burden. In general, the use of NOIs for most point sources provides permitting authorities with useful information to assist in oversight and enforcement of permittees, such as the specific location of the facility and its discharge. However, because vessels are mobile point sources that do not operate from a fixed location and may discharge to multiple receiving waters, the usefulness of requiring the entire universe of point sources covered by this general permit to submit NOIs is questionable.

In order to determine which vessels would appropriately be required to submit NOIs, EPA looked at the universe of vessels that would be covered by this permit and found a logical break between larger and smaller vessels, based on the types of discharges from these vessels, the variety of discharges containing conventional and toxic pollutants, and the volume and nature of those discharges. The volume of the discharges incidental to the normal operation of the vessel is expected to vary proportionately to the size of the vessel. Larger vessels will each individually have a greater volume of discharge and are more likely to have greater volume of discharges of concern (i.e., graywater and anti-foulant leachate). The expected volume of discharges for large vessels is significant for each individual vessel. For instance, a container ship can discharge thousands of cubic meters (millions of gallons) of ballast water; pounds of anti-foulant leachate, and significant quantities of bilgewater. Cruise ships have the potential to discharge large volumes of graywater due to the sizeable on-board ship populations, in addition to other discharges typical of such large vessels (for example, ballast water, bilge water, etc.). Therefore, larger vessels are far more likely to discharge larger quantities of toxic and conventional pollutants than smaller vessels due to a number of factors including the range of constituents in the discharge. EPA expects that smaller commercial vessels will have a smaller range of discharge types than larger commercial vessels. Some of the typical discharges eligible for coverage under the permit are nearly ubiquitous for most vessels, including deck runoff, bilge water, and leachate from anti-foulant hull coatings. However, larger commercial vessels have a greater range of discharges which will be of greater volume. Thus, the limited range of discharge types from smaller vessels and the reduced likelihood for the introduction of significant quantities of toxic and conventional pollutants make requiring an NOI for these vessels to be of little value at this time. In addition, EPA has access to other sources of data available for identifying discharges from vessels covered by the permit, including state registration information, MARAD vessel calls, U.S. Coast Guard registration and customs records, and data from the National Ballast Water Information Clearinghouse (NBIC). From these sources, EPA can obtain information from which we can deduce the nature of ship and boat discharges from these smaller vessels.

Based on the analysis outlined above, EPA has determined that it would be inappropriate to require smaller commercial vessels to provide information about their discharges through submission of an NOI. The cutoff for submission of an NOI of 300 or more gross tons is consistent with U.S. Coast Guard requirements, including those for environmental pollution control (33 CFR 155.320), Automatic Identification System (AIS) carriage requirements (33 CFR 164.46), port security requirements, fuel oil and bulk lubricating oil discharge containment requirements (33 CFR 155.320), and requirements for radar observers and chief engineers (33 CFR 15.820 and 33 CFR 15.820).

The criterion of vessels equipped to hold or discharge more than 8 cubic meters of ballast water was established for two reasons. First, as of this time, there is not a method by which EPA can predict invasions from any vessel source. However, the greater the number of viable organisms released into the receiving water, the greater the propagule pressure, which increases the risk for a successful invasion by an aquatic nuisance species. The volume of water discharged likely correlates to the number of organisms discharged; hence, lower volumes of water should contain fewer potential organisms which can successfully establish themselves. A vessel that carries and discharges 2,500 cubic meters of ballast water poses a greater risk to receiving waters than the vessel that carries 5 cubic meters. Therefore, the greater the volume of ballast water discharge, the greater the likelihood of creating enough propagule pressure to result in an enhanced risk of the spread of aquatic nuisance species. Secondly, the 8 cubic meter threshold is generally consistent with provisions in the recent International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004) providing for "equivalent compliance" for certain vessels in lieu of compliance with all provisions of the treaty. Hence, this is a recognized standard among mariners.

Based on the analysis outlined above, EPA has determined that smaller vessels eligible for coverage under the VGP need not submit an NOI. However, these owner/operators must still complete the VGP Permit Authorization and Record of Inspection (PARI) form (discussed below) and maintain that form on board at all times. EPA is including the PARI form because we believe it is an efficient way for the owner/operator to certify that they have read and agreed to comply with the terms of the permit, and demonstrate basic understanding of the permit's terms and conditions. In addition, the form will provide EPA (or its authorized representative) with a standardized foundation for conducting inspections. Based upon EPA's experience in implementing the 2008 VGP, EPA found that many smaller vessel owner/operators were confused about their obligations under the VGP because they were not required to submit the NOI form. Some of these vessel owner/operators erroneously believed that they were not subject to the VGP terms and conditions, and furthermore thought that they did not need to obtain alternative NPDES permit coverage. Hence, the purpose of this form is to reduce confusion within the industry and to confirm that these vessel owner/operators have read the terms of the VGP and understand their obligation to comply.

3.7.2 How to Obtain Authorization (Part 1.5.1)

To obtain authorization under the permit, operators must meet the Part 1.2 eligibility requirements and, if required by Part 1.5.1.1 of the permit, submit a complete and accurate NOI according to the requirements in Appendix E (Part 10 in the Permit), no later than the permit effective date.

Part 1.5.1.1 describes which operators of a vessel are required to submit an NOI, and Table 1 sets out the timeframes within which an NOI must be submitted. An operator is required to submit an NOI for its vessel if the vessel meets either of the following two criteria:

- The vessel is greater than or equal to 300 gross tons, or
- The vessel has the capacity to hold or discharge more than 8 cubic meters (2113 gallons) of ballast water.

3.7.2.1 Owner/Operators Required to Submit NOIs (Part 1.5.1.1)

Owner/operators required to submit an NOI for their vessel must submit an NOI in accordance with Table 1 of the permit. When completing the NOI form, the owner/operator is asked to select which discharge types the vessel is likely to produce. All discharges covered by the permit will be covered for the vessel, even if the owner/operator does not select all discharges. The form will allow EPA to better understand which vessel types typically produce which discharges, but will not limit permit coverage for the vessel owner/operator as long as the vessel is in compliance with the permit requirements. Table 1 specifies applicable deadlines for different categories of operators to submit NOIs. All NOIs will be made available for public review through posting on the internet. EPA may request that the owner/operator seek coverage under Part 1.8 of the permit (Alternative Permits) if appropriate.

When the ownership or operation of a vessel that is already covered under this permit is transferred, the new owner/operator must submit to EPA an NOI for the vessel by the date of transfer. The new NOI then becomes effective on the date the transfer takes place, or on the date EPA receives the NOI, whichever is later.

For new vessels delivered to the owner/operator after December 19, 2013, the deadline for submission of an electronic NOI is no later than 7 days before the vessel will discharge into waters subject to this permit. The discharge authorization date for these vessels is 7 days after the complete electronic NOI is received by EPA.

For existing vessels delivered to the owner/operator after December 19, 2013, that were not previously covered under this permit, the deadline for submission of an electronic NOI is no later than 7 days before the vessel will discharge into waters subject to this permit. Except as noted in the following paragraph, the discharge authorization date for these vessels is 7 days after the complete electronic NOI is received by EPA and 30 days after a complete paper NOI is received and processed by EPA. NOI processing means that a complete electronic NOI has been submitted and successfully certified by the permittee, or in the case of a Paper NOI, that EPA has received your NOI and input the information into its electronic system. Submitting paper NOIs may result in processing delays dependent upon volume received. Permittees will be able to know when their electronic and paper NOIs are processed by looking at EPA's online NOI search tool accessible from EPA's NPDES Vessels homepage at: http://www.epa.gov/npdes/vessels. In addition, NOIs submitted for transfer of ownership and/or operation of a vessel whose discharge is previously authorized under the permit are authorized immediately upon commencement of transfer provided a complete and accurate NOI is submitted and processed prior to that transfer.

Prior to EPA authorizing coverage, based on a review of an NOI or other information, EPA may delay the discharge authorization date for further review, or may deny coverage under the permit and require submission of an application for an individual NPDES permit, as detailed in Part 1.8 of the permit. In these instances, EPA will notify the NOI submitter in writing of the delay or the request for submission of an individual NPDES permit application. If EPA requires an individual permit for an existing vessel previously covered by this general permit, EPA will allow the permittee a reasonable amount of time to obtain individual permit coverage before their general permit coverage terminates.

Part 1.5 and 4.2 4 of the permit requires that all vessel owner/operators must keep records of their NOIs or PARIs on board their vessels. As with other records kept for purposes of the VGP, electronic records meeting the requirements under Part 4.2.1 of the permit meet this requirement.

Based on a review of the NOI or other information, EPA may delay the authorization of the owner/operator's discharge or may deny coverage under the permit and require submission of an application for an individual NPDES permit, as detailed in Part 3.10.1. EPA will notify the owner/operator in writing of any such delay or the request for submission of an individual NPDES permit application. For existing vessels covered under this general permit at the time it is issued, EPA will allow a reasonable time period to obtain alternate permit coverage before coverage under this permit is terminated.

3.7.2.2 Owner/Operators Not Required to Submit NOIs (Part 1.5.1.2)

An operator of a vessel is not required to submit an NOI pursuant to Part 1.5.1.2 of the permit if the vessel is less than 300 tons and does not have the capacity to hold or discharge more than 8 cubic meters of ballast water.

As a requirement of this permit, vessel owner/operators that are not required to submit NOIs must complete the VGP PARI Form contained in Appendix K of the permit. The PARI form must be signed and maintained on board the vessel for the entire permit term. EPA emphasizes that these owner/operators would still be subject to all applicable requirements contained within the permit even if they fail to complete and retain the form.

A certification statement is included in the VGP PARI that is required under this permit. This form and certification must be printed, signed and kept on the vessel while under permit coverage.

When implementing the 2008 VGP, EPA found that not requiring smaller vessels to submit an NOI created confusion for some smaller vessel owner/operators about their obligations under the 2008 VGP. The PARI form requires that a vessel owner operator state he or she has read the terms of the VGP and agrees to comply with the terms of the permit. Furthermore, the PARI serves as a record for any inspector that the smaller vessel owner/operator has read, and agreed to abide by the terms of the VGP. EPA specifically seeks comments on the inclusion of this new requirement.

If an owner/operator not required to submit an NOI wishes EPA to consider alternative permit requirements for the vessel, he or she must apply to EPA for a substitute permit applicable to his or her vessel as required by Part 1.8 of the permit within 90 days (Alternative Permits).

3.7.3 Continuation of the Permit (Part 1.5.2)

If the permit is not reissued or replaced prior to its expiration date, existing dischargers will continue to be covered under an administrative continuance, in accordance with section 558(c) of the APA and 40 CFR 122.6. The current permit will remain in effect for discharges that were covered prior to expiration until EPA acts on a permit renewal. If coverage is provided to a permittee prior to the expiration date of the permit, the permittee would automatically be covered by the permit until the earliest of: (1) the authorization for coverage under a reissuance or replacement of the permit, following timely and appropriate submittal of a complete NOI, if required; (2) submittal of a Notice of Termination; (3) issuance of a new general permit that covers your vessel discharges or vessel type and provides you coverage without requiring you to submit an NOI to obtain coverage; (4) issuance or denial of an individual permit for the permittee's discharges; or (5) formal permit decision by EPA not to reissue the general permit, at which time EPA will identify a reasonable time period for covered dischargers to seek coverage under an alternative general permit or an individual permit.

EPA has followed this approach in order to extend coverage for these permittees under a permit vehicle until re-issuance of the permit or coverage under some other permit. For more information, see 40 CFR 122.6. EPA does not have the authority to provide coverage to "new" vessels seeking coverage under an expired permit (i.e., vessels that were not covered under the permit prior to expiration).

3.8. TERMINATING COVERAGE (PART 1.6)

3.8.1 Submitting a Notice of Termination (NOT) (Part 1.6.1.1)

Part 1.6.1 of the permit encourages those permittees that are required to submit NOIs to use the eNOI system to file NOTs. If a permittee who is required to submit an NOI wishes to terminate coverage under the permit, he/she must submit a NOT in accordance with Appendix F. The permittee's authorization to discharge under the permit terminates at 11:59 pm on the day that a complete NOT is processed and posted on EPA's website (www.epa.gov/npdes/vessels/eNOI). However, the NOT is invalid and the permittee must continue to comply with the permit if none of the conditions identified in Part 1.6.1.2 are met. The permittee has a continuing responsibility for the discharges from its vessel until the NOT is submitted and processed by EPA. See below for a more detailed discussion of Part 1.6.2.

3.8.2 When to Submit a Notice of Termination (Part 1.6.1.2 and Part 1.6.2)

3.8.2.1 Terminating Coverage for Vessels Required to Submit an NOI

If a permittee was required to submit an NOI, and subsequently meets one of the conditions identified in Part 1.6.1.2, he/she must submit an NOT, preferably to the eNOI system. An NOT is required to be submitted within 30 days after one or more of the following conditions has been met: (1) a new owner or operator has assumed responsibility for the vessel; (2) operation of the vessel has permanently ceased in waters subject to this permit and there are no longer vessel discharges; or (3) permit coverage has been obtained under an individual or alternative general permit for all discharges requiring NPDES permit coverage, unless the permittee is directed by EPA to obtain this coverage. EPA uses the term 'permanently ceased' in this context to mean that the vessel owner/operator does not intend to resume operations in waters subject to this permit during the permit term. A vessel owner is not required to submit an NOT every time the vessel leaves waters subject to this permit if the vessel may return to waters subject to this permit during the permit term. This allows a vessel to maintain coverage under the permit, as long as the permit's terms and conditions continue to be met when the vessel is operating in waters subject to this permit.

The permittee's authorization to discharge under the permit terminates at 11:59 pm on the day that a complete NOT is posted on EPA's website (www.epa.gov/npdes/vessels/enoi). The permittee has a continuing obligation to comply with all permit conditions until a compliant NOT is submitted to and processed by EPA and posted on EPA's website.

3.8.2.2 Terminating Coverage for Vessels Not Required to Submit an NOI

If a vessel owner/operator is not required to submit an NOI, the vessel's permit coverage is automatically terminated if: (1) a new owner or operator has assumed responsibility for the vessel; (2) operation of the vessel has permanently ceased in waters subject to this permit and there are no longer vessel discharges; or (3) permit coverage has been obtained under an individual or alternative general permit for all discharges requiring NPDES permit coverage.

3.9. CERTIFICATION (PART 1.7)

Today's permit contains a requirement that any person signing the NOI, NOT, the VGP PARI Form, and any reports (including any monitoring data) submitted to EPA, in accordance with the permit must include the certification statement available in Part 1.7. This certification statement includes an additional sentence that, prior to the VGP issued in December 2008, had not been included in previous EPA issued NPDES general permits. The sentence reads: "I have no personal knowledge that the information submitted is other than true, accurate, and complete." EPA believes this additional certification language is necessitated by the decision in *U.S. v. Robison*, 505 F.3d 1208 (11th Cir. 2007). In *Robison*, the Court of Appeals struck down the defendant's conviction for a false statement on the grounds that the certification language did not require him to have personal knowledge regarding the truth or falsity of the information submitted to EPA. Rather, the court reasoned that EPA's certification required the defendant to certify, in part, that he made an inquiry of the persons who prepared and submitted the information and based on that inquiry, the information was accurate to the best of his knowledge. The court further reasoned that there is no requirement in the certification that the person attest to his personal knowledge regarding the information submitted. The government had argued at trial that the defendant had personal knowledge that the facility had committed violations. As a result, EPA feels it is necessary to include language which clarifies that the signatory is certifying that he or she has no personal knowledge that the information submitted is other than true, accurate, and complete.

3.10. Alternative Permits (Part 1.8)

3.10.1 EPA Requiring Coverage Under an Alternative Permit (Part 1.8.1)

Pursuant to 40 CFR 122.28(b)(3), EPA may require a discharger to apply for and obtain an individual permit instead of obtaining coverage under the general permit. These regulations also provide that any interested party may petition EPA to take such an action. The issuance of an individual permit will be in accordance with 40 CFR Part 124 and provide for public comment and appeal of any final permit decision. The circumstances in which such an action would be taken are set forth at 40 CFR 122.28(b)(3).

3.10.2 Permittee Requesting Coverage Under an Alternative Permit (Part 1.8.2)

After issuance of the permit, the permittee may request to be excluded from such coverage by applying for an individual permit. In such a case, the permittee must submit an individual permit application, no later than 90 days after the date of publication of final permit in the Federal Register, in accordance with 40 CFR 122.28(b)(3)(iii), along with a statement of reasons supporting the request, to the applicable EPA Regional Office listed in Part 7 of this permit. The request may be granted by issuance of an individual permit or authorization of coverage under an alternative general permit if the reasons are adequate to support the request. Under this scenario, if an individual permit is issued, or authorization to discharge under an alternative NPDES permit is granted, your authorization to discharge under this permit is automatically terminated under 40 CFR 122.28(b)(3)(iv) on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit.

3.11. Permit Reopener Clause (Part 1.9)

This permit contains a reopener clause allowing the permit to be re-opened and modified during the term of the permit, consistent with the Federal regulations at 40 CFR sections 122.62, 122.63, 122.64, and 124.5. Among other things, under 40 CFR 122.62 permit modification may be necessary if new information, not available at the time of permit issuance, is received that would have justified the application of different permit conditions at the time of issuance. While EPA believes that the VGP's technology-based ballast water implementation schedule is appropriate, given the large number of vessels subject to the ballast water numeric effluent limits, it is possible that a situation may arise in which treatment technology for a certain vessel, or specified group of vessels, may not be available within the timeframe specified in part 2.2.3.5.2, Table 6 of the VGP, such that this information (not available at the time of permit issuance) would have justified the imposition of a different implementation date had it been known at the time of permit issuance. As a result, it may be appropriate on a case-by-case basis to adjust the implementation schedule to reflect BAT, as it applies to a vessel or group of vessels.

EPA recognizes that the U.S. Coast Guard may grant an extension to the implementation schedule contained in its final rule regulating ballast water discharges "in those cases where the master, owner, operator, agent, or person in charge of a vessel subject to this subpart can document that despite all efforts to meet the ballast water discharge standard requirements in 151.2030 of this subpart, compliance is not possible." 33 CFR 151.2036. Coast Guard's regulations require that such extension requests be submitted no later than 12 months before the scheduled implementation date listed in 151.2035(b). EPA believes that this time frame will be sufficient for EPA to evaluate and implement, as appropriate, any request for an alternate implementation date through a permit modification, including the required public notice and comment. EPA and the Coast Guard will work together to ensure the agencies are as consistent as possible under their respective authorities in making their determination to grant or deny a request for a change to an implementation date. To enhance that consistency, one of the stated factors EPA will consider is whether the Coast Guard has received a written extension request pursuant to 33 CFR 151.2036 and any supporting technical information in that request. An additional factor that EPA will consider, where appropriate, in its evaluation of any such request is the availability of a ballast water treatment system type-approved by the Coast Guard for the vessel class of the vessel for which an extension is requested. EPA advises that where the U.S. Coast Guard has granted or denied an extension request pursuant to 33 CFR 151.2036, that information will be considered by EPA, but is not binding on EPA.

EPA notes that in addition to a permit modification to the VGP, an alternate mechanism for extending the implementation date applicable to a particular vessel is to issue an individual permit in accordance with Part 1.8 of the VGP. As provided in long-standing EPA enforcement policy, the "compliance history" of the regulated entity is to be taken into account when determining the appropriate response to a violation of an NPDES permit; accordingly, the Agency may consider any good faith efforts by vessels operators to meet applicable compliance deadlines under the VGP in any Agency response to noncompliance.

The permit reopener clause may also be an appropriate vehicle to address other types of new information that would justify revised permit conditions. Such information could also allow EPA to determine whether reinitation of formal consultation could be required as provided in 50 CFR §402.16. Specifically with respect to ballast water discharges, new information that will be considered in determining whether to modify this permit includes but is not limited to data or information from permittees, the general public, states, academia, scientific or technical articles or studies, and results of monitoring conducted under this permit indicating that:

- Treatment technology has improved such that these improved technologies would have justified the application of significantly more stringent effluent limitations or other permit conditions had they been known at the time of permit issuance;
- Treatment technologies known of at the time of permit issuance perform significantly better than understood at the time of permit issuance such that this improved performance would have justified the application of significantly more stringent effluent limitations or other permit conditions had this been understood at the time of permit issuance;
- Scientific understanding of pollutant effects or of invasion biology has evolved such that this new information would have justified the application of significantly more stringent effluent limitations or other permit conditions had this been understood at the time of permit issuance; or
- The cumulative effects of any discharge authorized by the VGP on the environment are unacceptable.

In considering whether to reopen the permit to address such new information, EPA will consider several factors, including the remaining time before the expiration date of the 2013 VGP, and the practicability of implementing new requirements before the end of the statutorily-mandated five-year term of the VGP in 2018.

3.12. OCEAN DISCHARGE CRITERIA

The Ocean Discharge Criteria (40 CFR Part 125, Subpart M) establish regulations for issuance of NPDES permits for discharges into the territorial seas, the contiguous zone and the ocean as these terms are defined in the CWA. The permit includes coverage of vessels operating as a means of transportation when within the territorial seas. EPA's issuance of the permit thus is subject to evaluation under the Ocean Discharge Criteria regulation with respect to discharges incidental to the normal operation of such vessels into the territorial seas. For purposes of this evaluation, the territorial seas means the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles (33 U.S.C. 1362(8)).

Under 40 CFR 125.123(a), if EPA, on the basis of available information determines prior to permit issuance that the discharges authorized will not cause unreasonable degradation of the marine environment, then EPA may issue an NPDES permit, which may include any conditions specified under 124.123(d) as necessary to assure that the discharge will not cause unreasonable degradation. The regulations at 40 CFR 125.121(e) define unreasonable degradation of the marine environment as meaning:

1. Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities,
2. Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms, or
3. Loss of aesthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

The Ocean Discharge Criteria require that EPA consider a number of factors in determining the degree of degradation to the marine environment. These factors include the amount and nature of the pollutants, the potential transport of the pollutants, the character and uses of the receiving water and its biological communities, the existence of special aquatic sites (including parks, refuges, etc.), any applicable requirements of an approved Coastal Zone Management plan, and potential impacts on water quality, ecological health and human health and any other factors the Administrator deems appropriate. 40 CFR 125.122(a). In addition, the Ocean Discharge Criteria establish a presumption that discharges in compliance with state water quality standards will not cause unreasonable degradation with respect to the pollutants subject to those standards. 40 CFR 125.122(b). After consideration of the Ocean Discharge Criteria, EPA has determined that the discharges authorized by the NPDES permit into the territorial seas in accordance with permit requirements will not cause unreasonable degradation of the receiving waters.

The discharges authorized by the permit are limited to those discharges incidental to the normal operation the vessel, and except for ballast water and graywater from cruise ships, typically will be of limited volumes. In addition, because vessels in the territorial seas are likely to be underway as part of their voyage, any discharges incidental to their normal operation would typically be well-mixed upon discharge before they are subject to further dispersal and transport beyond the area of the vessel's operation.

In the case of ballast water, the permit contains interim conditions (Part 2.2.3 of the permit) related to exchange of ballast water and saltwater flushing of empty ballast tanks beyond the outer limits of the territorial seas to reduce the risk of introduction of invasive species resulting from vessel discharges to waters of the United States within the territorial seas. EPA believes that these controls will prevent unreasonable degradation of the marine environment. In addition, the permit establishes numeric concentration-based limits for living organisms in ballast water and a schedule for meeting such limits, which will provide further protection for the marine environment. With respect to graywater from cruise ships, the permit also includes (Parts 5.1 and 5.2 of the permit) additional conditions to reduce the impacts of graywater discharges to acceptable levels. EPA believes that these provisions are necessary to prevent unreasonable degradation of the marine environment.

In developing the permit, the Agency has taken into consideration that discharges incidental to the normal operation of vessels that are subject to the permit have the potential to be contaminated with oil or other potentially persistent or bioaccumulative pollutants. The permit therefore contains a number of best management practices intended to avoid or reduce the potential for such contamination (e.g., section 2.1). In addition, the permit requires (section 2.1.5) compliance with all federal environmental laws that establish controls on oily or hazardous discharges, including among others, CWA section 311 (33 U.S.C. 1321), the Act to Prevent Pollution from Ships (33 U.S.C. 190-1915), the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), and the Oil Pollution Control Act, 33 U.S.C. 2701-2761. EPA believes that these controls are necessary to prevent unreasonable degradation of the marine environment.

The Agency also has taken into account the biological communities and receiving waters that would be exposed to the discharges incidental to the normal operation of vessels that will be authorized by the permit. This consideration has necessarily been complicated by the fact that vessels have the potential to traverse vast distances in the territorial sea while discharging. The Agency has taken an approach of identifying potentially sensitive areas in which vessels may operate and providing for additional controls when discharges occur in such areas. In addition to requiring compliance with marine sanctuaries provisions of the National Marine Sanctuaries Act (16 U.S.C. 1431 *et seq.*) and implementing regulations found at 15 CFR Part 922 and 50 CFR Part 404 (Part 2.1.5), the permit includes other conditions to impose additional controls and requirements on covered discharges in sensitive receiving waters (Part 2.3 of the permit). EPA has also determined that issuance of this permit will not adversely affect essential fish habitat (see 12.3 of this Fact Sheet).

Finally, this permit applies to discharges to the outer limit of the three mile territorial sea. State water quality standards also apply within these waters and the permit thus contains effluent limitations as necessary to meet those applicable water quality standards (Parts 2.3 and 6 of the

Permit). EPA has requested states' certifications under section 401 of the Clean Water Act, and requested concurrence on EPA's consistency determination for this permit from state coastal management agencies, in accordance with section 307(c) of the Coastal Zone Management Act (CZMA). Additional conditions are incorporated into Part 6 of the permit, pursuant to CWA section 401, CZMA section 307(c), and implementing regulations. Under 40 CFR 125.122(b), EPA presumes that discharges in compliance with state water quality standards will not cause unreasonable degradation of the marine environment with respect to specific pollutants or conditions specified in such standards.

In light of the foregoing, EPA has determined that issuance of the permit will not cause:

1. Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities,

2. Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms, or

3. Loss of aesthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

Accordingly, in accordance with 40 CFR 125.123(a), the Agency has determined that issuance of the permit with the controls complies with the Ocean Discharge Criteria guidelines established under CWA section 403(c).

3.13. Other Conditions (Parts 1.11, 1.12, and 1.13)

This permit contains savings clauses which state that nothing in the permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by section 510 of the Clean Water Act or applicable requirements or prohibitions under other provisions of Federal law or regulations. In addition, Federal regulations require that the standard permit conditions provided at 40 CFR 122.41 be applied to all NPDES permits. As provided by the introductory text of 40 CFR 122.41 and the regulation at 40 CFR 122.43(c), all of the standard permit conditions published in federal regulations at 40 CFR 122.41 (2008) are incorporated into the permit by reference. The permit requires permittees to comply with all applicable standard conditions. These regulations may be viewed at: http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&sid=ddda7b420b62b6e4a956b3f5cf50db8b&rgn=div5&view=text&node=40:22.0.1.1.12&idno=40 and will be included in the docket for this permit.

3.14. Electronic Reporting Requirement

Pursuant to Part 1.14 of the permit, vessels covered the 2013 VGP must report all results to EPA electronically, unless they meet one of the requirements for and are granted a waiver as specified in Part 1.14 of the VGP. These reasons are if:

- EPA has not yet developed electronic tools to allow such electronic submission of VGP reporting information, and has not yet implemented such electronic reporting;
- The owner/operator's headquarters is physically located in a geographic area (i.e., zip code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission and the vessel never travels to any areas with adequate broadband Internet access; or
- The vessel owner/operator has issues regarding available computer access or computer capability.

Electronic reporting improves efficiency for both vessel owner/operators and EPA. EPA believes that the vast majority of vessel owner/operators are able to submit NOIs and reporting results electronically and most prefer electronic communication versus submitting hard copy documents. For example, in the 2008 VGP, where electronic submittal of NOIs was encouraged, vessel owner/operators submitted electronic NOIs for approximately 99% of covered vessels.

As mentioned above, in those rare cases where vessel owner/operators are unable to report electronically, EPA has included a provision to allow for hard copy submittal of information on a case by case basis, assuming the vessel owner/operator meets certain minimum requirements.

EPA plans to make any ballast water monitoring data available in electronic form available to the public in electronic form. EPA believes that such an approach increases the transparency of permit compliance without unduly increasing the burden on the regulated community or EPA. The data will likely be made available in the format of a searchable interface available via EPA's webpage at www.epa.gov/npdes/vessels. For an example of how EPA makes VGP related data available to the public, please see EPA's NOI search feature, also available at www.epa.gov/npdes/vessels.

3.15. ADDITIONAL NOTES

As discussed more fully later in this fact sheet, the permit incorporates by reference (as BAT/BPT) several provisions of federal law, class society and flag state requirements. EPA has clarified in the permit "notes" section that the permit is intended to refer to those provisions as they were in effect on the date of issuance of the final VGP. Hence, the permit's provisions that require compliance with statutes and regulations other than the Clean Water Act refer to those authorities as codified as of the date of the Federal Register notice that will announce the availability of this final permit. References to class society or flag state requirements are also as of that date. All of the provisions in this section were included in the 2008 VGP and have been moved to Part 1.15 of the VGP for editorial reasons.

4. EFFLUENT LIMITATIONS

4.1. BACKGROUND

The Clean Water Act (CWA) requires that all point source discharges must meet technology-based effluent limitations representing the applicable levels of technology-based control. Water quality-based effluent limitations (WQBELs) are required as necessary where the technology-based limitations are not sufficient to meet applicable water quality standards (WQS). See *P.U.D. No. 1 of Jefferson County et al. v. Washington Dept. of Ecology*, 511 U.S. 700, 704 (1994). Water quality-based requirements will be discussed in greater depth in section 4.3. Both technology-based and water quality-based effluent limitations are implemented through NPDES permits containing such limitations issued to point sources. CWA sections 301(a) and (b).

4.1.1 The Clean Water Act Requires EPA to Develop Effluent Limitations that Represent the Following:

4.1.1.1 Best Practicable Control Technology Currently Available (BPT)

The CWA requires BPT effluent limitations for conventional, toxic, and non-conventional pollutants. Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD_5), total suspended solids, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979. 40 CFR 401.16. EPA has identified 65 pollutants and classes of pollutants as toxic pollutants, of which 126 specific substances have been designated priority toxic pollutants. 40 CFR 401.15 and 40 CFR Part 423 Appendix A. All other pollutants are considered to be non-conventional.

In specifying BPT, under CWA section 301(b)(1)(A), 304(b)(1)(B), and 40 CFR 125.3(d)(1), EPA looks at a number of factors. EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed, and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and such other factors as the EPA Administrator deems appropriate. Traditionally, EPA establishes BPT effluent limitations based on the average of the best performance of facilities within the industry of various ages, sizes, processes, or other common characteristics. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

4.1.1.2 Best Conventional Pollutant Control Technology (BCT)

The 1977 amendments to the CWA required EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. CWA section 301(b)(2)(E); 304(b)(4)(B); 40 CFR 125.3(d)(2). In addition to considering the other factors specified in section 304(b)(4)(B) to establish BCT limitations, EPA also considers a two part “cost-reasonableness" test. EPA explained its methodology for the development of BCT limitations in 1986. 51 FR 24974 (July 9, 1986).

4.1.1.3 Best Available Technology Economically Achievable (BAT)

For toxic pollutants and non-conventional pollutants, EPA promulgates effluent limitations based on BAT. CWA section 301(b)(2)(A); 304(b)(2)(B); 40 CFR 125.3(d)(3). In establishing BAT, the technology must be technologically “available” and “economically achievable.” The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, non-water quality environmental impacts, including energy requirements, and other such factors as the EPA Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight accorded to these factors. BAT limitations may be based on effluent reductions attainable through changes in a facility's processes and operations. Where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved within a particular subcategory based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

This permit contains effluent limits that correspond to required levels of technology-based control (BPT, BCT, BAT) for various discharges under the CWA. Some effluent limits have been established by examining other existing laws and requirements. Where these laws already exist, it was deemed feasible for the operators to implement these practices as effluent limits in this permit. Because these are demonstrated practices, EPA has found that they are technologically available and economically practicable (BPT) or achievable (BAT). In some cases, such as with discharges of oils, including oily mixtures, graywater discharges from cruise ships (under certain circumstances), and for ballast water discharges, numeric effluent limits have been established.

4.1.2 Numeric Limitations Are Infeasible

Because of the nature of vessel discharges, it is not practicable to derive numeric effluent limits to achieve these levels of control for many of the discharge types until greater information is available. Constituents in properly controlled discharges may vary widely based upon vessel type, size, and activities occurring on board the vessel. In such situations, the CWA authorizes EPA to include non-numeric effluent limits in NPDES permits.[6] 40 CFR 122.44(k)(3). The VGP includes such non-numeric effluent limits developed for discharges for which developing numeric effluent limits are infeasible to calculate at this time. Many of these non-numeric effluent limits require permittees to engage in specific behaviors or best management practices (BMPs).

For example, vessel owner/operators must apply a broom clean standard (or similar management measure) to remove all debris before conducting deck washdowns. Additionally, to reduce the impact of oils leaking into the marine environment from oil to sea interfaces, many vessels must use environmentally acceptable lubricants. Additionally, several BMPs require vessels to “minimize” pollutant discharges. For purposes of this permit and consistent with the

[6] Refer to more detailed discussion below under “EPA’s Authority To Include Non-Numeric Technology-Based Effluent Limits In NPDES Permits,” “EPA’s Decision To Include Non-Numeric Technology-Based Effluent Limits In This Permit” and 40 CFR 122.44(k)(3).

technology-based requirements of the CWA, EPA is clarifying that the term "minimize" means to reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best marine practice.

This permit defines the term "minimize" in order to provide a reasonable approach by which EPA, permittees, and the public can determine/evaluate appropriate control measures for vessels to control specific discharges. EPA believes that for some vessel discharges, minimization of pollutants in those discharges can be achieved without using highly engineered, complex treatment systems. For other vessel discharges, highly engineered, complex, treatments systems that are reliable and approved for use on vessels are not currently available. The specific limits included in Part 2 of the permit emphasize effective pollution prevention controls, such as requiring phosphorus free soap, storing chemicals in protected areas of the vessel, and minimizing production of graywater in port. In other cases, they require more complex behavioral practices such as saltwater flushing or ballast water exchange as interim ballast water management requirements. In yet other cases, more advanced treatment may be necessary.

4.2. Technology-Based Effluent Limits

EPA has determined that the technology-based numeric and non-numeric effluent limits in this permit, taken as a whole, constitute the first level of control (BPT for all pollutants) and the second level of control (BAT for toxic and non-conventional pollutants and/or BCT for conventional pollutants) for discharges from vessels. For all of the discharges in this permit, the technology-based limits are based on best professional judgment, as authorized under CWA section 402(a)(1) and 40 CFR 125.3.

4.2.1 Types of Technology-Based Effluent Limits

As stated above, the CWA establishes two levels of technology-based controls. The first level of control, "best practicable control technology currently available," or "BPT" applies to all pollutants. CWA section 304(b)(1)(B); 33 U.S.C. 1314(b)(1)(B). BPT represents the initial stage of pollutant discharge reduction, designed to bring all sources in an industrial category up to the level of the average of the best source in that category. See *EPA v. National Crushed Stone Association*, 449 U.S. 64, 75-76 (1980). In the second level of control, all point sources are required to meet effluent limitations based on "best conventional pollutant control technology," or "BCT" CWA section 304(b)(4)(B); 33 U.S.C. 1314(b)(4)(B) or "best available technology economically achievable," or "BAT" CWA section 301(b)(2)(A); 33 U.S.C. 1311(b)(2)(A), depending on the types of pollutants discharged. BCT applies to conventional pollutants, listed at 40 CFR 401.16 (biological oxygen demand (BOD_5), pH, fecal coliform, total suspended solids (TSS), and oil and grease). BAT applies to toxic and non-conventional pollutants. Technology-based limits are to be applied throughout an industry sector without regard to receiving water quality. *Appalachian Power Co. v. EPA*, 671 F.2d 801 (4th Cir. 1982).

4.2.2 Inclusion of Non-Numeric Technology-Based Limits in NPDES Permits

NPDES permits are required to contain technology-based limitations. CWA sections 301(b)(1)(A)(BPT); 301(b)(2)(A)(BAT), 301(b)(2)(E) (BCT); 40 CFR 122.44(a)(1).

Technology-based limits in the permit represent the BPT (for conventional, toxic, and non-conventional pollutants), BCT (for conventional pollutants), and BAT (for toxic and non-conventional pollutants) level of control for the applicable pollutants. Where EPA has not promulgated effluent limitations guidelines and standards (ELGs) for an industry, or if an operator is discharging a pollutant not covered by the effluent guideline, permit limitations may be based on the best professional judgment (BPJ, sometimes also referred to as best engineering judgment) of the permit writer. 33 U.S.C. 1342(a)(1); 40 CFR 125.3. See *Student Public Interest Group v. Fritzsche, Dodge & Olcott*, 759 F.2d 1131, 1134 (3d Cir. 1985); *American Petroleum Inst. v. EPA*, 787 F.2d 965, 971 (5th Cir. 1986). For this general permit, all of the technology-based limits are based on BPJ decision-making because no ELGs apply.

Many of the BPJ limits in the permit are in the form of non-numeric control measures, commonly referred to as best management practices (BMPs). BMPs are considered "effluent limitations" within the meaning of the CWA. See *Citizens Coal Council v. EPA*, 447 F.3d 879, 895-96 (6th Cir. 2006); *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 502 (2d Cir. 2005) (holding that site-specific BMPs at issue constitute effluent limitations within the meaning of the CWA); *Natural Res. Def. Council, Inc. v. EPA*, 673 F.2d 400, 403 (D.C. Cir.1982) ("section 502(11) defines 'effluent limitation' as '*any* restriction' on the amounts of pollutants discharged, not just a numerical restriction."). Through the Agency's NPDES permit regulations, EPA interpreted the CWA to allow BMPs to take the place of numeric effluent limitations under certain circumstances. 40 CFR §122.44(k), entitled "Establishing limitations, standards, and other permit conditions (applicable to State NPDES programs ...)," provides that permits may include BMPs to control or abate the discharge of pollutants when: (1) "[a]uthorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities"; (2) "[a]uthorized under section 402(p) of the CWA for the control of stormwater discharges"; (3) "[n]umeric effluent limitations are infeasible"; or (4) "[t]he practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA." 40 CFR 122.44(k).

Various courts have held that the CWA does not require the EPA to set numeric limits where such limits are infeasible. See, e.g., *Natural Resources Defense Council v. Costle*, 568 F.3d at 1380 ("when numerical effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels"); *Citizens Coal Council v. EPA*, 447 F.3d 879, 895-96 (6th Cir. 2006). The Sixth Circuit cited to *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 502 (2d Cir. 2005), stating "site-specific BMPs are effluent limitations under the CWA" (agreeing with EPA that the CWA does not require numeric effluent limits "where such limits are infeasible" because "a baseline pollutant loading cannot be calculated.").

4.2.3 EPA's Decision to Include Non-Numeric Technology-Based Effluent Limits in This Permit and Rationale for Why the Limits Represent the Appropriate (BPT, BCT or BAT) Level of Control[7]

Non-numeric Limits

[7] EPA's rationales for inclusion of numeric limits appear in the discharge-by-discharge discussions as applicable

With some exceptions, numeric effluent limitations are not feasible to calculate for vessel discharges in this permit iteration. Those exceptions include graywater and pool and spa discharges from cruise ships; oily discharges, including oily mixtures; some bilgewater discharges; and ballast water discharges. EPA may develop numeric effluent limits for certain additional discharge types for the next permit iteration, if applicable. Vessels vary widely by type and/or class, size, and activity and can discharge a wide variety of waste streams, whose volume and composition will vary dependent upon seas, cargo carried, and age of the vessel. Additionally, vessel operators cannot install equipment onboard their vessels until that equipment has been approved by the Coast Guard and, in some cases, their class societies. Hence, EPA cannot require use of equipment or technologies that would conflict with the requirements of these organizations without fully understanding the implications of such requirements.

These factors create a situation where, at this time, it is generally not feasible for EPA to calculate numeric effluent limitations to effectively regulate vessel discharges, with the exceptions noted above (graywater and pool and spa water discharges from cruise ships; some oil discharges, including oily mixtures for vessels; some bilgewater discharges; and ballast water discharges). EPA is able to calculate numeric effluent limits for these groups because extensive research has been conducted and effective pollution control technologies are widely or will be widely commercially available. Therefore, in light of these considerations, EPA has determined that it is not feasible for the Agency to calculate numeric, technology-based limits for many of the discharges covered under this permit, and, based on the authority of 40 CFR 122.44(k)(3), has chosen to adopt non-numeric effluent limits.

<u>Rationale for Finding that the Limits in this Permit Represent the BPT, BCT or BAT Level of Control</u>

The BAT/BCT/BPT non-numeric effluent limits in this permit are expressed as:

- Specific pollution prevention practices for minimizing or eliminating the pollutants or constituent of concern in the discharge.
- Specific behavioral practices for minimizing or eliminating the pollutants or constituent of concern in the discharge.
- Narrative requirements to minimize pollutants or constituents of concern in discharges or the discharges themselves.[8]
- Limiting or eliminating discharges at certain times for discharge types that can be limited or eliminated for short periods due to technology available on board the vessel and the vessel design (i.e., if the vessel can hold the discharge type for limited periods or reduce production of the effluent).

In the context of this general permit, EPA has determined these non-numeric effluent limits represent the best practicable technology (BPT) for all pollutants, the best conventional

[8] These types of effluent limits allow owner/operators to use control measures appropriate for their vessels to meet those limits.

pollutant control technology for conventional pollutants (BCT) and the best available technology economically achievable (BAT) for toxic and non-conventional pollutants. EPA has determined that the combination of pollution prevention approaches and structural management practices described above are the most environmentally sound way to control the discharge of pollutants from vessels.

Requirements are Technologically Available

EPA has found that the requirements of this permit represent the appropriate level of control representing BPT, BCT, and BAT. For example, many class societies require that vessels have coamings or drip pans underneath machinery as a way to keep oil from entering the bilge, being discharged to surrounding waters, or creating hazardous conditions on the vessel deck. The majority of vessels already have these available measures in place to eliminate the discharge of oil from their vessels, and many frequently clean oil from the drip pans if present. Hence, EPA believes this requirement represents BPT and this permit requires that all vessels follow this common sense approach if feasible. As an example of an effluent limit that meets BPT and BAT standards, EPA is requiring existing vessel operators to comply with additional ballast water management requirements such as mandatory saltwater flushing for vessels with empty ballast water tanks (see section 4.4.3.6 of this fact sheet for additional discussion) before they must meet the VGP's numeric ballast water effluent limits. These requirements are available, in part, because of the Saint Lawrence Seaway Corporation's mandatory requirements for vessels entering through the Seaway (33 CFR Part 401.30), and many U.S.-bound vessels with empty ballast tanks already perform saltwater flushing. Furthermore, because not all of these vessels will have reliable treatment technology for removing residual living organisms installed on their vessels for the full permit term (because immediately requiring installation onboard all vessels is economically unachievable), saltwater flushing represents BAT since it is the best approach currently available for these vessels under this standard.

EPA has found that it is technologically possible to prohibit discharges in certain waters, and therefore such a limit is technologically available. However, it is not possible to prohibit these discharge categories under all circumstances. EPA decided which discharge types to prohibit in certain waters based on the environmental impacts of discharges and technical information as to whether vessels have the capacity to hold certain discharge types. These sources of information included technical experts and publications cited in this fact sheet including US EPA 1999; Alaska Department of Environmental Conservation (ADEC) and Science Advisory Panel, 2002; Lamb, 2004; and EPA, 2008.

As an example, some vessels such as cruise ships have the ability to hold graywater for a period from hours to days. Likewise, many large vessels can retain treated bilgewater on board in the bilge for prolonged periods; however, it must periodically be discharged or emptied. Yet another example is the discharge of AFFF for maintenance purposes. Vessel owner/operators may elect where they conduct the maintenance, thereby controlling where they will discharge. Since vessels are mobile and can move from water to water, EPA has determined that vessels have the technology to limit their discharges in select waters. Therefore, under the authority to consider "other factors the Administrator deems appropriate," EPA has determined that the requirement to limit discharges to specific waters is technologically available. However, as mentioned, EPA finds that it is not technologically available to limit all discharge types in certain waters. For instance, in the case of deck runoff, vessel operators have little control as to when water may runoff from the deck into surrounding waters without potentially creating major safety concerns. Hence, EPA is not prohibiting the discharge of certain discharge types into waters of greater concern where methods to do so are not technologically available.

Requirements Meet the BPT and BAT Economic Tests Set Forth in the CWA

There are different economic considerations under BPT, BCT and BAT. EPA finds that the limits in this permit meet the BPT and BAT economic tests. Because the types of controls under consideration minimize toxic, nonconventional, and conventional pollutants, conventional pollutants are controlled by the same practices that control toxic and nonconventional pollutants. Hence, EPA is evaluating effluent limits using a BPT and a BAT standard, but since conventional pollutants will also be adequately controlled by these same effluent limits for which EPA applied the BPT and BAT tests, EPA has determined that it is not necessary to conduct BCT economic tests.

Under BPT, EPA has determined that the requirements of this permit are economically practicable. To make this determination, EPA has considered the reasonableness of the relationship between the costs of application of technology and the effluent reduction benefit derived. CWA section 301(b)(1)(B); 40 CFR 125.3(d)(1). EPA expects the permit requirements to reduce the risk of invasive species spread, to minimize production of effluent in high quality waters, to reduce nutrient loading, and to minimize the risk of other constituents entering vessel waste streams.

EPA has determined that the requirements of this permit are economically achievable. In determining "economic achievability" under BAT, EPA has considered whether the costs of the controls can reasonably be borne by the industry. EPA typically evaluates "closures," whereby the costs of requirements are evaluated to see whether they would cause a facility to go out of business. EPA has assessed the costs of the requirements in this permit and finds that this permit will result in no "closures" in that the costs of the permit are small compared to all operating costs. EPA has assessed the costs of the requirements and finds that except in rare cases, the cost of implementing this permit is estimated to be below 1% of the total operating costs of almost all entities for any given year. The total domestic flagged vessel universe that would be affected by this permit includes approximately 58,600 vessels. Additionally, EPA estimates that approximately 12,400 foreign flagged vessels will be covered by the VGP. Including the ballast water and other discharge requirements, the economic impact analysis indicates that the best management practices in this permit would cost between $7.2 million and $23.0 million annually, relative to the 2008 VGP and current practice. EPA applied a cost-to-revenue test which calculates annualized pre-tax compliance cost as a percentage of total revenues and used a threshold of 1 and 3 % to identify entities that would be significantly impacted as a result of this Permit. See EPA's Economic Analysis (US EPA, 2011a) prepared for this permit for further discussion. Based on this analysis, EPA concludes that the BAT limits in this permit are unlikely to result in a substantial economic impact on businesses of any size, and, in particular, small businesses. Hence, EPA interprets this analysis to indicate that the BAT limits are economically achievable. The economic analysis is available on EPA's webpage at www.epa.gov/npdes/vessels and in the docket for this permit.

Additionally, the discharge location limitation is economically practical and achievable, since discharging in one location versus another will add no or little additional cost. The only potential costs are an increase in fuel consumption from carrying additional volumes of effluent rather than discharging the effluent immediately when generated. EPA expects these incremental costs associated with this permit to be small relative to total operating costs. EPA's information in the record does indicate, however, that it is possible and economically practicable and achievable to minimize graywater and some additional discharges in waters federally protected wholly or in part for conservation purposes. Therefore, under EPA's authority to consider "other factors the Administrator deems appropriate," it is reasonable to focus the limitations on certain discharge types that would have the most environmental significance. In addition, this restriction is alternatively and independently based on EPA's authority under CWA section 403(c).

Requirements have Acceptable Non-Water Quality Environmental Impacts

In addition, EPA has considered the non-water quality environmental impacts, including energy impacts, of the controls required under this permit and finds that they are acceptable. EPA anticipates that the requirements of this permit may result in marginal increase in fuel usage for vessels that must treat graywater to standards in Part 5 of the permit, or must limit the discharge location of certain waste streams and transport them into a different receiving water or hold them for discharge onshore. Additionally, owner/operators of vessels may generate more sludge or other waste that may need to be disposed of properly onshore. EPA expects that most permit requirements will result in few non-water quality impacts because, in many cases, the permit is reflective of practices currently being implemented by owner/operators.

Data Sources

As described more fully throughout this fact sheet, EPA finds that today's final permit contains technology-based controls that represent the BPT, BCT or BAT levels of control.

In developing these non-numeric effluent limits, EPA considered data from numerous peer reviewed publications, literature produced by the federal government, other technical reports and publications, public comments, and comments from experts working in the field (e.g., Albert et al., 2010, CSLC, 2010; Dobroski et al., 2009; Dobroski et al., 2011; Endresen et al., 2004; Environmental Law Institute, 2004; Gracki et al., 2002; Gray et al., 2007; Gregg & Hallegraeff, 2007; Lamb, 2004; Lee et al., 2010; Lloyds Register, 2010; Locke et al., 1993; McCollin et al., 2007; NAS, 2011; Orange County Coastkeeper, 2007; Quilez-Badia et al., 2008; Raikow et al., 2007; Schiff et al., 2004; Tamburri et al., 2002; US EPA, 1999, 2001a, b, 2008a, 2010a, 2011). The data sources from which EPA derived information for decision-making purposes are included in the docket for the final permit and/or referenced in this fact sheet. These data sources discuss, among other things, vessel discharge types, BMPs available for these discharge types, and the effectiveness of given BMPs or behavioral practices.

4.3. Technology-Based Effluent Limits and Related Requirements in the Permit

4.3.1 General Effluent Limits (Part 2.1)

The general effluent limits are designed to apply to all covered vessels for all covered discharge types present on a particular vessel. These effluent limits are generally preventative in nature and are designed to minimize the discharge of pollutants from a vessel. Owner/operators are ultimately responsible for ensuring that all required effluent limits are implemented.

As discussed above, these technology-based effluent limits apply to all covered vessels and were developed using BPJ. These general technology-based effluent limits were established based on available and relevant information, including available technical data, existing statutes and regulations, statistical industry information, and research studies cited in the references section of this permit.

4.3.1.1 Material Storage (Part 2.1.1)

Any materials, whether cargo or for use onboard the vessel, that may be exposed to precipitation, surface water spray, or wind can potentially be discharged on their own or become part of other waste streams. Materials that may not be considered toxic in small concentrations could pose an environmental threat if significant amounts are washed overboard, particularly in shallow or impaired waters.

Therefore, the permit requires that all vessel operators practice good environmental stewardship by minimizing any exposure of cargo or onboard materials that may result in releases of contaminants to the environment. This can be accomplished by containerizing or tarping materials, and generally limiting any exposure of these materials to wind, rain, or spray. In addition, if water draining from the storage area comes into contact with any oily materials, except for naturally occurring fish oils from fishing gear stored on deck, the permit requires measures to prevent the oil from being discharged in harmful quantities (pursuant to Parts 2.1.1 and 2.1.4 of the Permit).

EPA believes that while specific numeric limitations on toxic substances are not feasible for this potential source of pollutants, sound marine practices should be sufficient to reduce most accidental or incidental discharges of cargo or stored materials. EPA also believes that emphasis on training and educating vessel crew on the use and environmental benefits of these practices should be standard practice.

4.3.1.2 Toxic and Hazardous Materials (Part 2.1.2)

The presence or use of toxic and hazardous materials may be necessary for the operation of vessels. As part of the permit's requirements, these materials must be properly contained to avoid contamination of the discharges covered by this permit. EPA has recommended human health and marine aquatic life criteria for a few toxic pollutants, but requiring numeric effluent limitations and corresponding sampling and analysis of discharges for all potentially harmful contaminants is not a reasonable option for this permit since discharges would be accidental in nature and the preventive requirements are just as effective as numeric limits at controlling such discharges. These provisions should effectively prevent the discharge of these toxic and hazardous materials from storage, spills, and containment. EPA believes that preventing the release of these substances to the environment is the appropriate environmental protection strategy. Vessel owner/operators are required to ensure that toxic and hazardous substances are treated in a manner that prevents releases due to precipitation or surface water spray. Just as EPA requires of land-based industries, vessels must store, label, and secure toxic and hazardous materials in suitable, sealed containers.

4.3.1.3 Fuel Spills/Overflows (Part 2.1.3)

Even small amounts of spilled fuel can contaminate large areas of water, making it uninhabitable for plants and animals. Most small spills can be prevented by taking basic precautions when filling fuel tanks. The permit requires vessel operators to implement these precautions that will prevent or, in the case of a spill, contain any fuel that is released to surface waters (e.g. use of booms). The discharge of any fuel spill or overflow may result in a discharge that may be harmful as defined by 40 CFR Part 110, which includes those discharges that cause a visible sheen. In addition, any larger scale fuel spill or overflow is not incidental to the normal operation of a vessel and therefore, not authorized by this permit. Through proper fueling operations and training on spill treatment, vessel operators may reduce impacts caused by human error or improper equipment use. EPA recognizes that fueling operations for large vessels are very different from fueling operations on small boats, and often large vessels will carry onboard several smaller vessels used as lifeboats, tenders, or rescue boats. Therefore, there are additional requirements for fueling of auxiliary vessels such as lifeboats, tenders, or rescue boats that are deployed from "host" vessels subject to the permit. These requirements include examining the surrounding area for the presence of a visible sheen during fueling, taking immediate and appropriate corrective actions if a sheen is observed as a result of the permittee's fueling operations, and using an oil absorbent material or other appropriate device while fueling to catch drips from vent overflow and fuel intake. Also, vessel owner/operators must regularly inspect the fuel and hydraulic systems for any damages or leaks, for instance during fueling, when performing routine maintenance on the auxiliary vessel, and/or during deployments for testing. These simple steps can prevent fuel spills and overflows that would lead to a discharge and minimize the impact of any fuel spills or overflows that do occur. These requirements have been adapted from EPA's previously proposed Recreational Vessel General Permit.

4.3.1.4 Discharges of Oil, Including Oily Mixtures (Part 2.1.4)

Discharges of oil, including oily mixtures, can significantly impact aquatic and terrestrial organisms and their ecosystems. When oil, including oily mixtures, is discharged in small quantities, aquatic ecosystems have limited ability to assimilate, oxidize, degrade, and destroy many of the hydrocarbons present in oil. However, when discharged in significant quantities from a single vessel, or in moderate quantities from numerous vessels, oil releases have been documented to create severe environmental impacts.

The permit requires that any oil, including oily mixtures, other than those exempted in 40 CFR 110.5, may not be discharged in quantities that may be harmful. These requirements are consistent with section 311 of the CWA and reinforce the requirement that discharges from the internal portions of vessels may not result in discharges of oil in quantities likely to impact aquatic ecosystems. The visible sheen test was chosen as an approach to determine whether oil is being discharged in quantities that may be harmful, because the visible sheet test is easy to use and is consistent with existing CWA requirements.

4.3.1.5 Compliance with Other Statutes and Regulations Applicable to Vessel Discharges (Part 2.1.5)

These effluent limits contain the requirement to comply with other applicable statutes and regulations dealing with vessel discharges. Reliance on other statutes and regulations to develop the permit requirements is a reasonable exercise of BPJ because these statutes and regulations have gone through an extensive process of evaluation and analysis by federal agencies that have considerable expertise in vessel management. Furthermore, many of the BMPs considered by EPA were covered by these other authorities. These statutes and regulations are currently being implemented and therefore are technologically and economically practicable (BPT) and achievable (BAT) in light of best marine practice. Rather than reiterate the provisions of these statutes and regulations in their entirety for the permit's general effluent limits, EPA has determined, based on BPJ, that incorporation of these statutes and regulations by reference is reasonable.

Some of the statutes and regulations that were examined to inform the Agency's BPJ decision and which are incorporated by reference into the provisions of the permit follow. These summaries are not meant to be legally comprehensive reiterations; rather, they are short summaries designed to inform owner/operators of the existence of these authorities. The actual statutes and regulations implementing these authorities are the legally binding conditions for the permit.

<u>MARPOL, APPS, and Implementing Regulations</u>

The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) is an international treaty that regulates certain discharges from vessels. Annexes to MARPOL regulate different types of vessel pollution; the United States is a Party to Annexes I, II, III, V, and VI. MARPOL is primarily implemented in the U.S. by the Act to Prevent Pollution from Ships (APPS), 33 U.S.C.1901 et seq. The U.S. Coast Guard is the lead agency for APPS implementation and has issued implementing regulations primarily found at 33 CFR Part 151. Those requirements already apply to many of the vessels covered by the permit.

APPS regulates the discharge of oil and oily mixtures, noxious liquid substances, and garbage, including food wastes and plastic.

With respect to oil and oily mixtures, Coast Guard regulations at 33 CFR 151.10 prohibit "any discharge of oil or oily mixtures into the sea from a ship" except when certain conditions are met, including a discharge oil content of less than 15 parts per million (ppm) and that the ship has in operation oily-water separating equipment, an oil content monitor, a bilge alarm, or a combination thereof. These requirements have been in place for a significant length of time, and the equipment necessary to meet these standards is widely available and already in use on ships subject to these regulations.

Substances regulated as "noxious liquid substances" (NLS) under APPS are divided into 4 categories based on their potential to harm marine resources and human health. <u>See</u> 33 CFR

151.47 and 151.49; 46 CFR Part 153, Table 1. Under 46 CFR 153.1128, discharges of NLS residues at sea may only take place at least 12 nautical miles from the nearest land. In light of this, the permit does not authorize such discharges within waters subject to the permit (i.e., inland waters and the waters of the 3 mile territorial sea).

Annex III to MARPOL addresses harmful substances in packaged form and is implemented in the U.S. by the Hazardous Materials Transportation Authorization Act of 1994, as amended (49 U.S.C. 5901 et seq.) and regulations appearing at 46 CFR Part 148 and 49 CFR Part 176. That regulatory scheme establishes labeling, packaging, and stowage requirements for such materials so as to help avoid their accidental loss or spillage during transport. 40 CFR 122.44(p) provides that when an NPDES permit is issued to a vessel operating as a means of transportation, the permit is to require compliance with any applicable Coast Guard regulations that establish specifications for safe transportation, handling, carriage, and storage of pollutants. The permit incorporates this requirement in Parts 1.13 and 2.1.5.

Oil Pollution Act (33 U.S.C. 2701 *et seq.)*

Additional requirements also affect vessel discharges, in particular, the Oil Pollution Act of 1990 and the associated U.S. Coast Guard implementing regulations at 33 CFR Parts 155 and 157. These regulations establish and reinforce the APPS 15 ppm discharge standard for oil and oily mixtures for oceangoing ships and require most vessels to have an oily water separator. Oceangoing vessels less than 400 gross tons must either have an approved oily water separator or retain oily water mixtures on board for disposal to an approved reception facility onshore. Oceangoing vessels more than 400 gross tons, except vessels that carry ballast water in their fuel oil tanks, must be fitted with “approved 15 parts per million (ppm) oily-water separating equipment for the processing of oily mixtures from bilges or fuel oil tank ballast.” 33 CFR 155.360. The maximum oily discharge standard is included as a binding requirement in this permit because it is the most appropriate standard for oil and oily discharges and maintains current national and international standards. 33 CFR Part 155 was also referenced for oil containment and cleanup equipment and procedures. This section provides information on both equipment and procedures that are required for preventing and reacting to oil spills and discharges.

Clean Water Act Section 311 (33 U.S.C. 1321)

Clean Water Act Section 311, Oil and Hazardous Substances Liability Act, states that it is the United States’ policy that there should be no discharges of oil or hazardous substances into waters of the U.S., adjoining shorelines, and certain specified areas, except where permitted under Federal regulations (e.g., the NPDES program). As such, the Act prohibits the discharge of oil or hazardous substances into these areas in such quantities as may be harmful. Further, the Act states that the President shall, by regulation, determine those quantities of oil and any hazardous substances that may be harmful if discharged.

EPA has defined oil quantities that “may be harmful” as those that violate applicable water quality standards or “cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoin shorelines." 40 CFR 110.3. Sheen is clarified to mean an iridescent appearance on the surface of the water. 40 CFR 110.1.

In the permit, oil, including oily mixtures, may not be discharged in quantities that may be harmful. This goal has proven to be achievable using available treatment technologies such as oil-water separators or oil absorbent materials. For other discharges that can potentially be contaminated by oils but may not easily be collected and treated, the Agency requires the operator to observe the surface of the receiving water to determine whether a sheen is visible. This would indicate that oils are present at concentrations that may be harmful and discharge must cease.

<u>The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)</u> (7 U.S.C. 136 *et seq.*).

FIFRA regulates the distribution, sale, and use of pesticides. One of the primary components of FIFRA requires the registration and labeling of all pesticides sold or distributed in the U.S. ensuring that if pesticides are used in accordance with the specifications on the label, they will not cause unreasonable adverse effects on humans or the environment. It is a requirement of the permit that any registered pesticide must be used in accordance with its FIFRA label. This is included as a binding permit requirement because FIFRA label requirements are established after review of the label and underlying science, and approval of the label, approved by the EPA Office of Chemical Safety and Pollution Prevention, and ensure that the pesticide, when used according to the label, can be used so that it will not cause unreasonable adverse effects on humans or the environment.

<u>National Marine Sanctuaries Act</u> (16 U.S.C. section 1431 *et seq.* and implementing regulations found at 15 CFR Part 922 and 50 CFR Part 404 (NMSA))

NMSA authorizes the designation and management of National Marine Sanctuaries to protect marine resources with conservation, education, historical, scientific, and other special qualities. Additional restrictions and requirements may be imposed on vessel owner/operators who boat in and around National Marine Sanctuaries. For more information, please see the NOAA National Marine Sanctuaries Program website at http://sanctuaries.noaa.gov/welcome.html.

4.3.1.6 General Training

The 2008 VGP outlined training requirements for owner/operators of specific vessel types, as identified in Part 5 of that permit. In order to clarify that broad instruction should be conducted to ensure that crews are adequately trained to implement all the terms of the VGP and operate all pollution prevention equipment on board, EPA has added general training as a new requirement of the 2013 VGP, pursuant to CWA section 402(a)(2), and 40 CFR 122.43(a) and other implementing regulations. For some vessels with existing Integrated Safety Management (ISM) plans, this may mean simply assuring those plans are consistent with the terms of the VGP, and that crews are aware of any other VGP requirements and how they must meet them. Others may require that the vessel chief engineer or Master read the permit and inform crew of their responsibilities. The general training requirement stipulates that all key personnel understand how to use key pollution prevention equipment; for example, if applicable, a master, chief engineer, and/or any key staff must understand how to properly operate and maintain an onboard ballast water treatment system as applicable. In addition, all owner/operators of vessels must ensure appropriate vessel personnel be trained in the procedures for responding to fuel spills and overflows, including notification of appropriate vessel personnel, emergency response agencies, and regulatory agencies. For vessels with less developed management systems, training may be more extensive, and could require environmental managers or others instructing crews on how to implement the permit and assure that terms of the permit are met. This permit does not require that vessel owner/operators provide any formal training, such as one of the many privately developed VGP training courses. However, for some vessel owner/operators, use of such courses might be an efficient and cost effective manner to provide training which will assist in ensuring that the terms of the permit are adequately implemented onboard their vessels.

Vessel owner/operators must outline their training plans in their recordkeeping documentation to show they have made good faith efforts to assure their crews can adequately maintain and use pollution prevention equipment and otherwise meet the terms of this permit.

4.4. Effluent Limits and Related Requirements for Specific Discharge Categories (Part 2.2)

4.4.1 Deck Washdown and Runoff Including Above Water Line Hull Cleaning (Part 2.2.1)

Constituents of deck runoff and above water line hull cleaning may include oil, grease, cleaner or detergent residue, paint chips, paint droplets, and general debris (e.g., paper, wire). Discharge rates for deck runoff vary from vessel to vessel and depend on weather, deck machinery, deck operations, and frequency of deck washdowns. It is infeasible to set specific numeric effluent limits for discharges of deck runoff due to variation in vessel size and associated deck surface area, types of equipment operated on the deck, and limitations on space for treatment equipment. Instead, the permit requires that vessel operators minimize discharges from deck runoff and implement BMPs to reduce their potential impact.

BMPs for controlling deck runoff and above water line hull cleaning are associated with (a) containing potential contaminants to keep them from entering the waste stream, (b) properly maintaining the deck and bulkhead areas to prevent excess corrosion, leaks, and metal discharges, and (c) using environmentally safe products for cleaning deck areas. Because it would be extremely difficult if not impossible to safely hold or treat all deck runoff for all vessel designs at all times, EPA is not requiring deck runoff to be collected and treated before discharge from all vessels. Requiring vessel owner/operators to collect deck runoff could either require major vessel modification of the ship's structure and machinery or could compromise the safety and stability of the vessel. Many vessels are designed to quickly discharge deck runoff as an operational necessity.

EPA is requiring that deck runoff be collected during certain times such as during or after fueling operations, when spills occur, or when required by a vessel's class society.[9] EPA is also requiring that vessel operators minimize contamination of deck runoff discharges by debris,

[9] A vessel's class society establishes technical standards related to the design, construction, and survey of a vessel.

garbage, and chemical spills (e.g., grease, fuel, hydraulic fluid, caustics, detergents). EPA is also requiring that the vessel owner/operator maintain the topside surface of the deck in a manner consistent with good marine practice that prevents excess discharge of metals and oils from eroding metals and deteriorating pipes, coamings, and other topside infrastructure. When machinery is located on deck, the use of drip pans when feasible will collect spilled oil and allow the vessel owner/operator to prevent its discharge. When required by their class societies (e.g., tank barges), vessels must be fitted with and use perimeter spill rails and scuppers to collect the runoff for treatment. In addition, if washing down the deck will result in a discharge, the washdown must be conducted with minimally-toxic, phosphate-free, and biodegradable cleaners and detergents, as those terms are defined in Part 7 of the permit. EPA expects that minimally-toxic cleaners and detergents will contain little to no nonylphenols. The purpose of this requirement is to minimize the discharge of caustic and potentially toxic detergents and solvents into waters subject to this permit. Phosphorus is one of the drivers of eutrophication or hypereutrophication, which is one of the major causes of impairment to waters of the United States. Toxic materials interfere with aquatic organisms and can contribute to chronic or acute effects, including death. Additionally, EPA is requiring that permittees must minimize residual paint droplets from entering waters subject to this permit whenever they are conducting maintenance painting. EPA is also requiring that discharges of deck runoff are consistent with all other relevant laws. EPA believes that adhering to these requirements will reduce the discharge of these potentially environmentally harmful substances. Finally, EPA has clarified in the 2013 VGP that before deck washdowns may occur, vessel owner/operators must broom clean exposed decks or use comparable management measures to remove all existing debris, and that vessel owner/operators may use the "equivalent" of broom cleaning as vessel owner/operators may use other methods to reduce debris on their decks. Though fundamentally similar to the requirements in the 2008 VGP, these requirements clarify that vessel owner/operators are expected to use obvious management measures to prevent the introduction of garbage or other debris into any waste stream.

4.4.2 Bilgewater (Part 2.2.2)

Bilgewater is an accumulation of water from various sources across the entire vessel. Constituents include oil, grease, volatile and semi-volatile organic compounds, inorganic salts, and metals. Volumes vary with the size of the vessel, and discharges typically occur several times per week. Cruise ship volumes have been estimated at 25,000 gallons per week for a 3,000 passenger/crew vessel (US EPA, 2008a).

Conditions in the 2008 VGP applicable to oily bilge water discharges from vessels are based on Annex I of the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78). Under Annex I to MARPOL, all ships over 400 gross tons (GT) are required to have equipment installed onboard that limits the discharge of oil into the oceans to 15 ppm when a ship is en route. All vessels over 400 GT are also required to have an oil content monitor (OCM), including a bilge alarm, integrated into the piping system to detect whether the treated bilge water that is being discharged from the bilge separator meets the discharge requirements. Some countries have bilge discharge requirements that are stricter than the international 15 ppm standard. For example, the Canadian Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals requires 5 ppm bilge alarms for Canadian-flagged vessels which discharge treated bilgewater on the Great Lakes.

Bilge separators, oil content meters and bilge alarms are certified by the Coast Guard to meet 46 CFR 162 (MARPOL Annex I implementing regulations). Type approval is based on testing of manufacturer-supplied oil pollution control equipment by an independent laboratory, in accordance with test conditions prescribed by the Coast Guard (33 CFR 155 and 157 and 46 CFR 162). In order to be consistent with International Maritime Organization (IMO) resolution MEPC.108(49), the measurement of oil (petroleum products or hydrocarbon, HC) in bilge separator effluent can be analyzed using ISO method 9377-2:2000[10] or equivalent. Alternatively, vessel owner/operators may use EPA method 1664.

Additional treatment stages (unit operations) are often added to bilge separators to better clean ("polish") bilge water to comply with current and potential future discharge standards (Sun et al., 2009; Caplan et al., 2000). In addition to providing greater overall reduction in bilge oil concentrations, the addition of treatment stages makes bilge separators more reliable by providing some redundancy to withstand problems or failure of individual stages. Including one or more polishing steps is an added cost to the operation of a ship; however, onboard bilge separation is typically more economical than holding all oily bilge water for transfer and subsequent treatment on shore (Ghidossi et al., 2009).

Bilgewater treatment technologies are also capable of removing other pollutants from bilge water. For example, Tomaszewska et al. (2005) found that ultrafiltration was effective in removing turbidity and suspended solids, organic carbon, and several trace metals (Al, Fe and Zn) from bilge water, in addition to oil.

As discussed more fully below, the 2013 VGP maintains most of the best management practices and numeric limits contained in the 2008 VGP.

4.4.2.1 Bilgewater Requirements

Vessel operators are required to minimize bilgewater generation by practicing proper maintenance of vessels and equipment. Routine cleaning and maintenance activities associated with vessel equipment and structures are considered to be normal operation of a vessel. However, EPA notes that the addition of substances not associated with the normal operation of a vessel to the bilgewater is not allowed.

EPA believes this reduction in the volume of waste will reduce the need for vessels to discharge treated bilgewater to waters of the U.S. EPA also recognizes that onshore disposal is not always a feasible alternative for larger vessels. As part of the permit, bilgewater discharges must adhere to all requirements under 40 CFR Parts 110, 116, and 117 and 33 CFR Part 151.10. These limitations are achievable with use of oily-water separators or use of a segregated bilge system. Large vessels generally must have onboard oily-water separation capabilities or hold their bilge for onshore disposal. Smaller vessels must also demonstrate that the discharge of bilgewater is sufficiently clean by conducting a visual sheen observation prior to and at the time of discharge. EPA has utilized the visual sheen test as a reliable indicator as to whether oil, including oily mixtures, is not being discharged in quantities that may be harmful.

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[10] This analytical method is "Water quality -- Determination of hydrocarbon oil index -- Part 2: Method using solvent extraction and gas chromatography."

All vessels greater than 400 gross tons which discharge bilgewater into waters subject to this permit must be equipped with an oil discharge monitoring system that monitors the discharge of oily bilge water into waters subject to this permit. These vessels must also be equipped with an overboard discharge control unit that automatically initiates the sequence to stop the overboard discharge of the effluent in alarm conditions and prevents the discharge throughout the period the alarm condition prevails. The overboard discharge control unit must be designed to receive automatic signals of oil content of the effluent, measured as ppm, from the oil content meter.

Each oil content meter and each control section of an oil discharge monitoring system must be subjected to a functional test that includes the operations listed in 33 CFR § 157.12f and is conducted as outlined in 46 CFR § subpart 162.050 on a suitable test bench prior to delivery. The detailed program for a functional test of such equipment must be developed by the manufacturer, taking into account the features and functions of the specific design of equipment and the types of oils that will be monitored. A completed workshop certificate, including the delivery functional test protocol, must be received with each unit delivered. A copy of the certificate must be carried aboard the vessel at all times.

Routine maintenance of the monitoring system and troubleshooting procedures must be clearly defined in the oil discharge monitoring system's Operating and Maintenance Manual kept onboard the vessel. All maintenance activities related to the bilge water monitoring system and overboard discharge control unit must be recorded and the information must remain on board for inspection purposes. In addition, vessel staff training must include familiarization with the operation and maintenance of the bilgewater overboard discharge control and oil discharge monitoring equipment.

If the vessel operator does not treat bilgewater with an oily-water separator, or it cannot be assured that the bilgewater will not cause a sheen on the surface of the receiving water, the bilgewater must be held onboard for onshore disposal. Vessel operators may not use dispersants, detergents, emulsifiers, chemicals, or any other substances to remove the appearance of a visible sheen. This requirement does not prohibit the use of these materials in machinery spaces for the purposes of maintaining or cleaning equipment.

The permit has additional BMPs for bilgewater that focus on where vessels may or may not discharge bilgewater. For instance, vessels that regularly leave waters subject to the permit (at least once per month), and are more than 400 gross tons, may not discharge treated or untreated bilgewater while stationary. In addition, vessels that regularly leave waters subject to the permit may not discharge treated bilgewater within 1 nm of shore if it is technologically feasible to hold it. In this context, technological feasibility includes consideration of operational constraints. It is EPA's understanding that many existing large vessels do not generate significant quantities of bilgewater and should have sufficient holding capacity.

In those cases where a vessel does not have the capacity to hold bilgewater generated in waters subject to this permit or where bilgewater is causing a general safety or stability concern or could enter a hold and contaminate cargo, or otherwise interfere with essential operations of the vessel, EPA would not consider holding the bilgewater to be technologically feasible. In these cases, even though the discharge is permitted (but must be recorded and reported), EPA believes that the permit will still limit the cumulative discharges of all vessels in an area collectively. The cumulative impact of numerous vessels releasing bilgewater in nearshore, estuarine environments or in waters with limited circulation can be of concern. Hence, this provision is included to limit the discharge of pollutants in areas where vessels are more likely to be concentrated, where the cumulative impact of discharges is likely to be higher, and in ecosystems that are already stressed and unlikely to have additional assimilative capacity. Vessels can then discharge the bilgewater, provided it meets all applicable laws, in waters that are likely to have greater assimilative capacity or where vessel traffic is not as concentrated, or the vessel can hold the bilgewater for proper onshore disposal. Other provisions limiting the location or manner in which bilgewater is discharged are based on a similar rationale.

4.4.2.2 EPA's Exploration as to Whether to Include More Stringent Bilgewater Management Requirements for New Build Vessels and Whether to Provide Existing Vessels with Additional Bilgewater Management Options

When the Agency published the draft 2013 VGP for comment, EPA specifically sought comment on whether to include a more stringent bilgewater management regime for new vessels and whether to provide existing vessels with additional bilgewater management options in the final 2013 VGP. EPA had researched the state of bilgewater treatment systems (US EPA, 2011b) and believed that a targeted reduction in the bilgewater effluent limit to 5 ppm oil and grease in U.S. waters might have been appropriate, as technology meeting such a limit appeared to be available for all vessels and economically achievable for at least new build vessels. However, EPA is not finalizing this option in today's permit due to concerns that have been raised regarding implementation that call into question whether these systems are, in practice, "available" and actually function onboard ships as their type approval data indicate they otherwise should.

EPA received a variety of comments on whether to include a 5 ppm limit, and those comments generally made three major assertions:

1) Before imposing requirements in the US, EPA should work with the international community at IMO to explore whether to have more stringent limits for new build vessels,

2) EPA should seek additional information as to whether systems do, in fact, continue to perform as indicated in their type approval data when actually on board ships, and

3) Type approved systems capable of meeting a 5 ppm limit are available.

Although EPA is not today adopting the 5 ppm option, as suggested in public comment, EPA plans to work with our international partners at the IMO to explore whether systems and alarms that do actually perform at 5 ppm are available in the marketplace. Working at IMO to obtain broad international acceptance of a 5 ppm limit would increase the economic achievability by providing a more widespread international market for such systems and broad international acceptance of, and type-approval testing to, the 5 ppm standard.

4.4.2.2.3 Annual Bilgewater Monitoring for New Build Vessels

When EPA published the draft permit for comment, EPA also sought comment on approaches for the monitoring of bilgewater discharges that would improve our understanding of that discharge and determine compliance with numeric limits. Based on the comments received on that proposal, EPA has finalized a modified, reduced monitoring regime from that in the draft VGP for new build vessels (built on or after December 19, 2013). EPA believes gathering this information is necessary to help inform the Agency about how systems actually perform onboard vessels and to help better characterize which vessels are actually discharging in waters subject to this permit. These data will help inform future regulatory decision making in addition to assisting the Agency in better understanding how vessels are meeting the 2013 VGP's existing permit terms.

In the proposed 2013 VGP, EPA sought comment on a monitoring regime that would require 5 sampling events for initial analytical monitoring and maintenance monitoring once per year for new build vessels greater than 400 gross tons planning to discharge bilgewater in waters subject to this permit. These draft requirements were being considered to assure that oily water separator systems were, in fact, regularly achieving their 5 ppm limit, the limit on which the Agency sought comment but decided not to impose in today's final permit (see discussion in Section 4.4.2.2). Although the Agency did not adopt the more stringent limit, EPA continues to believe that annual bilgewater monitoring information from new vessels as discussed in the draft VGP fact sheet would provide valuable information to the Agency in determining future requirements for bilgewater discharges. As described in the 2011 technical development document on oily water separators (US EPA, 2011b) and earlier in this fact sheet, though EPA believes many oily water separators are able to achieve their design limit (15 ppm or 5 ppm depending on the system) in the type approval setting, EPA is also aware that performance during operation can be variable. In some cases, systems may actually perform better than their manufacturers claim. In others, field conditions such as improper maintenance or other operational challenges in the marine environment can result in underperformance. Hence, EPA has finalized this revised monitoring regime in the 2013 final VGP to help the Agency and shipping industry stakeholders better understand how oily water seperator systems are actually performing. In the interest of encouraging the use of the most advanced and effective technologies, EPA has also included a reduced frequency monitoring incentive for those vessels who demonstrate their oil and grease discharge is below 5 ppm on at least two consecutive sampling events.

Analytical Monitoring

Annually, new build vessels greater than 400 gross tons which discharge bilgewater into waters subject to this permit must collect a sample of the bilgewater effluent for analysis of oil by Method ISO 9377-2 (2000) Water Quality–Determination of hydrocarbon oil index–Part 2: Method Using Solvent Extraction and Gas Chromatography (incorporation by reference, see 46 CFR § 162.050–4) or EPA Method 1664 to demonstrate treatment equipment maintenance and compliance with this permit. At the time of sample collection, the reading on the oil content meter will be recorded so the oil concentration measured by the laboratory can be compared to the oil content meter. The monitoring may be conducted during the vessel's renewal survey or during the course of normal operations, at the discretion of the vessel owner/operator.

In addition, an annual test of the oil discharge monitoring system alarm functions and the electronic-valve switching function must also be performed onboard the vessel to verify they will activate when the oil concentration measured by the oil content meter is greater than regulatory limits

A vessel owner operator may cease conducting analytical monitoring if the following conditions are met:

- A vessel which has an oil discharge monitoring system that has been type approved by any flag administration to a 5 ppm standard or has an alarm and overboard discharge control unit which prevents the discharge of any bilgewater with an oil content of greater than 5 ppm oil and grease;
- The analytical monitoring results are below 5 ppm oil and grease for two consecutive years of permit coverage; and
- The vessel only discharges bilgewater when the oil content monitor reads below 5 ppm oil and grease.

If a vessel has not met the above conditions, that vessel owner/operator must conduct annual analytical bilgewater monitoring for each year of permit coverage.

Records of the sampling and testing results must be retained onboard for a period of 3 years in the vessel's recordkeeping documentation. Records of monitoring information shall include:

- The date, exact place, and time of sampling or measurements, and any meter recalibration;
- The individual(s) who performed the sampling or measurements, and any meter recalibration;
- The date(s) analyses and any meter recalibration were performed;
- The individual(s) who performed the analyses and any meter recalibration;
- The techniques or methods used for sample analyses and any meter recalibration; and
- The results of such analyses and any meter recalibration.

Monitoring Reporting

The vessel owner/operator must submit data showing that the bilgewater standards are achieved by their oil discharge monitoring system to EPA's e-reporting system, unless they meet one of the exceptions to electronic reporting found in Part 1.14 of this permit. Monitoring data must be submitted at least once per calendar year no later than February 28 of the year after the data are collected. Data may be submitted as part of the vessel's annual report

4.4.2.2.4 Why EPA included Annual Monitoring for New Build Vessels

As discussed above, EPA sought comment on whether vessels greater than 400 gross tons electing to discharge bilgewater in waters subject to this permit should complete additional monitoring requirements to periodically assure the accuracy of their oil content monitor. Vessels must be equipped with an oil discharge monitoring system that monitors the discharge of oily bilge water into waters subject to this permit. Vessels must also be equipped with an overboard discharge control unit that automatically initiates the sequence to stop the overboard discharge of the effluent in alarm condition and prevents the discharge throughout the period the alarm condition prevails. The control unit must be designed to receive automatic signals of oil content of the effluent, measured as ppm, from the oil content meter. EPA incorporated the modified monitoring requirements to gain a better understanding of the state of bilgewater treatment onboard vessels. The monitoring methods rely on both analytical methods and the vessels existing oil content meters and monitoring conditions based upon readily available and generally accepted methods. Additionally, by allowing vessel owner/operators to cease monitoring if they have results below 5 ppm for two consecutive years, the Agency is providing an incentive to those vessel owner operators which invest in advanced technology and maintain it appropriately. EPA has estimated the additional cost associated with analytical monitoring in the economic analysis accompanying this permit, and found that the costs of monitoring are economically achievable for new build vessels electing to discharge bilgewater within waters subject to permit. Please see US EPA (2011a) for additional discussion regarding the costs of these permit conditions.

4.4.3 Ballast Water (Part 2.2.3)

Technology-Based Effluent Limitations

In today's permit, EPA has finalized new, more stringent numeric technology-based effluent limitations to replace the non-numeric limitations in the 2008 VGP for ballast water. These changes will achieve significant reductions in the number of living organisms discharged via ballast water into waters subject to this permit. EPA has set the numeric effluent limit for ballast water as numbers of living organisms per cubic meter discharged (i.e., as a maximum acceptable concentration) because reducing the concentration of living organisms will reduce inoculum densities of potential invasive species discharged in a vessel's ballast water. As part of today's permit, EPA has also established discharge limitations for certain biocides and residuals (expressed as an instantaneous maximum).

EPA's SAB (2011) recommended that EPA not solely rely on numeric standards for ballast water discharges, in particular that:

> "…EPA adopt a risk-based approach to minimize the impacts of invasive species in vessel ballast water discharge rather than relying solely on numeric standards for discharges from shipboard BWMS. The Panel found that insufficient attention has been given to integrated sets of practices and technologies that could be used to systematically advance ballast water management. These practices include managing ballast uptake to reduce the presence of invasive species, reducing invasion risk through operational adjustments and changes in ship design to reduce or eliminate the need for ballast water,

development of voyage-based risk and/or hazard assessments, and treatment of ballast water in onshore reception facilities." (EPA SAB, 2011)

Consistent with this recommendation, EPA has included some of the management practices referenced above in the permit and continues to explore other integrated approaches to managing ballast water risk reduction.

Vessel owner/operators subject to the concentration-based numeric treatment limit may meet their obligations in one of four ways: discharge treated ballast water meeting the applicable numeric limits in Part 2.2.3.5 of the VGP; transfer of the ship's ballast water to a third party (which may be onshore or on another vessel such as a treatment barge); use of treated municipal/potable water as ballast water; or by not discharging ballast water. In addition, vessels enrolled in, and meeting the requirements of the US Coast Guard's Shipboard Technology Evaluation Program (STEP), are deemed to be compliant with the permit requirements for ballast water treatment.

Ballast water typically consists of ambient water taken onboard to maintain vessel draft, trim, stability, and stresses, regardless of how it is carried. Large commercial vessels (e.g., container ships, bulk carriers, other cargo vessels, tankers, and passenger vessels) normally have ballast tanks dedicated to this purpose and some vessels may also put ballast water in empty cargo holds. The discharge rate and constituent concentrations of ballast water will vary by vessel type, ballast tank capacity, quality of and constituents contained in the ambient source waters, efficacy of any treatment applied to the discharge of ballast water, type of deballasting equipment, and other factors. Volumes of ballast water discharged are significant and can range from several hundred to many thousands of cubic meters of water. For instance, large passenger vessels (cruise ships) have a representative ballast capacity of about 3,000 cubic meters (about 790,000 gallons) while ultra-large crude carriers (ULCCs) have a representative ballast capacity of about 95,000 cubic meters (about 25 million gallons) (ABS, 2010). Some vessels, such as small water ferries, may have as little as 5 cubic meters (about 1321 gallons) of ballast water.

Ballast water discharge has been cited as one of the primary sources (or vectors) for the spread of aquatic invasive species, also known as aquatic nuisance species (ANS) (Carlton, 1985; Carlton and Geller, 1993; Gollasch et al., 2002; Kasyan, 2010). These species can enter new aquatic environments when the vessel operator discharges from ballast water tanks. These organisms may also be released when vessel operators load ballast water into ballast tanks with existing residual water or sediment, mixing the new ballast water with the residual water and sediment, which may contain viable living organisms and organisms in resting stages, then later discharge this mixed effluent. When species in ballast tanks are transported between waterbodies and discharged, they have the potential for establishing new, non-indigenous populations that can cause severe economic and ecological impacts. The permit includes technology-based numeric limitations and other provisions to limit the concentrations of potentially viable organisms that are released into potentially receptive aquatic habitats.

ANS cause substantial environmental and economic harm to the United States. Well known examples of ANS or pathogens that have been introduced to U.S. waters include Chinese mitten crab, European green crab, hydrilla, European loosestrife, Eurasian water milfoil, round goby, melaluca, salt cedar, Viral Hemorrhagic Septicemia (VHS), and zebra mussels. For additional information on the impacts of ANS introduced via ballast water discharges, refer to some of the numerous studies and reports that have been completed and are available in the docket for today's permit (Bolch & Salas, 2007; Dobbs et al., 2006; Doblin et al., 2007; Drake & Lodge, 2007; Drake et al., 2007; Endresen et al., 2004; Knight et al., 1999; M.G.G. et al., 2003; NAS, 2011; Reynolds et al., 1999; Roman, 2006; Ruiz et al., 2000a; Ruiz et al., 2000b; Smayda, 2007; US EPA, 2001; Zo et al., 1999). For additional information on the impact of aquatic nuisance species, refer to section 3.4.1 of this fact sheet and the economic analysis available in the docket for today's permit.

4.4.3.1 Training

As a requirement of this permit, the master, operator, person-in-charge, and crew members who actively take part in the management of ballast water must have a general understanding of ballast water systems on board vessels. Crew must be able to effectively implement all appropriate requirements laid out in a vessel's ballast water management plan. For vessels which have a ballast water treatment system onboard, crew engaged in the active management of ballast water must understand how to operate and maintain ballast water equipment. Additionally, if the vessel crew will engage in sampling of any ballast water discharge streams, those crew must understand how to engage in proper sample collection, handling, and packaging. Thus, EPA is requiring that owner/operators maintain a written training plan, which describes the training provided to the vessel crew, as well as a record of the date on which that training was provided to each member of the crew. This can be in the form of a stand-alone training plan, can be incorporated into the vessel's ballast water management plan, or other recordkeeping documentation as appropriate (provided the vessel's crew can quickly point to this language for their use and purposes of inspection). The permit does not prescribe the appropriate level of detail of the written training plan; this should be determined by the permittee. In general, it need only be detailed enough to document that appropriate training is taking place.

EPA included these requirements pursuant to 40 CFR 122.44(k), which requires EPA to impose best management practices when "reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA." See also CWA section 402(a)(2) and 40 CFR 122.43(a). The Agency believes that ballast water management is complex, and inadequately trained crew may not appropriately implement the ballast water requirements found in this permit, thereby increasing the risk that the effluent limits and standards of the permit will not be achieved.

4.4.3.2 Ballast Water Management Plans

All vessels equipped with ballast water tanks must have a ballast water management plan. US Coast Guard regulations also establish mandatory ballast water reporting and recordkeeping requirements (33 CFR 151.2041 and 151.2043), and also require vessels to have a ballast water management plan that is specific for that vessel and assigns responsibility to the master or appropriate official to understand and execute the ballast water management strategy for that vessel (33 CFR 151.2035(a)(7)).

Like the 2008 VGP, this iteration of the VGP also requires that all vessel owner/operators maintain ballast water management plans as a requirement related to effluent limits. As part of these plans, vessel owner/operators must document how they will meet the ballast water requirements contained in the VGP.

EPA notes that the requirement to do such a plan is being imposed as "conditions to assure compliance" with effluent limitations under CWA§ 402(a)(2) and 40 CFR 122.43(a), and as practices "reasonably necessary to achieve effluent limitations and standards or to carry out the intents and purposes of the CWA," per 40 CFR 122.44(k).

4.4.3.3 Mandatory Ballast Water Management Practices: Management Measures Required of all Vessel Owner/Operators

As in the 2008 VGP, EPA has included, pursuant to 122.44(k), best management practices (BMPs) applicable to all vessels equipped with ballast water tanks that enter or operate within waters subject to this permit as technology-based effluent limits. EPA's Science Advisory Board (2011) found that "insufficient attention has been given to integrated sets of practices and technologies that could be used to systematically advance ballast water management." Hence, consistent with the recommendations of that panel, EPA has retained the current BMPs and developed additional management measures, both found in Part 2.2.3.3 of the VGP, which are designed to reduce the number of living organisms taken up in, and later discharged in, ballast water or to ensure that such discharges do not occur in known sensitive areas. Many of these measures are consistent with existing requirements found in the 2008 VGP and US Coast Guard regulations (found at 33 CFR 151, Subparts C and D), and therefore, are widely followed practices by the regulated community. The remainder are practices that EPA believes will be reasonably easy to implement. EPA thus finds these practices to be available and economically achievable. Additionally, EPA notes that the discharge of ballast water in critical habitat should be avoided when feasible, consistent with the advice offered to EPA by NMFS and FWS during EPA's consultation with those two federal resource agencies. The list of critical habitat can be found at: http://criticalhabitat.fws.gov/crithab/; and http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm.

Examples of these BMPs include avoiding or minimizing ballast water uptake in areas recognized as having a high potential to contain harmful organisms, only discharging the minimum amounts of ballast water necessary in coastal and internal waters, and regularly cleaning ballast water tanks to remove sediment. When achievable, vessel operators should not take up ballast water in any waters with a known outbreak of harmful organisms and/or invasive species such as Pfisteria blooms (or other harmful algal blooms) and viral hemorrhagic septicemia (VHS) and instead use internal ballasting. In these areas, it may be achievable for vessel owner/operators to avoid the uptake of water. When the uptake of ballast water is required in these waters, the vessel owner/operator must take on ballast in those waters that have the lowest known risk factors for these harmful organisms. Additionally, when feasible, vessel owner/operators must deballast using their pumps rather than gravity draining their tanks unless they meet the limits found in Part 2.2.3.5 of the permit. This is because pumps cause increased mortality among living organisms, particularly zooplankton and other larger organisms, that might otherwise be discharged (due to among other things, cavitation, entrainment, and/or impingement.

Like the 2008 VGP, today's permit does not authorize the discharge of sediments from the cleaning of ballast tanks. Hence, the discharge of sediment removed from tanks by cleaning operations into waters subject to this permit, including the discharge of sediments suspended as a result of ballast tank cleaning, are prohibited from being discharged into waters covered by this permit and must be disposed of in accordance with any applicable local, State, and Federal regulations. Regarding sediment disposal, vessel owner/operators may need to make arrangements for proper onshore disposal or arrangements to discharge sediment outside waters subject to this permit unless prohibited by statute or applicable law). Sediment could be removed when vessels are in port or while vessels are in drydock. Furthermore, because EPA did not authorize the discharge of sediments in the 2008 VGP, the Agency assumes that all vessel owner/operators are currently complying with these permit requirements. Based upon data submitted on vessel NOIs for the 2008 VGP, the vast majority of vessels discharge sediment from the cleaning of ballast tanks to either onshore facilities or when they are out of waters subject to this permit. See Table 2 below.

Table 2: Ballast Water Sediment Disposal Methods by Vessel Types/Categories Based on NOI Data for the 2008 VGP (Data Current as of December 2010: Values are in Percent of Vessels for which a Response was Provided)

Methods	Barges	Oil and Gas Tankers	Comm. Fishing	Large Ferries	Large Cruise Ship	Med. Cruise Ship	Research	Emerg.	Other
Onshore at shipyards via third party	78	37	81	50	72	49	55	84	70
Onshore/Landfill	0.2	4	0	2	0	0	2	4	0
Onshore and Offshore	0	19	0	0	10	13	7	4	7
Offshore/overboard	0.8	37	6	6	18	19	8	5	16
Not applicable/ No Ballast	21	3	13	42	0	19	28	3	7
Total # Respondents	**6,950**	**2,521**	**123**	**62**	**97**	**16**	**74**	**56**	**8,529**

EPA has not authorized the discharge of sediment from cleaning of ballast tanks for two primary reasons. First, sediment poses a risk for the further distribution of aquatic nuisance or invasive species. Organisms can survive in ballast sediment for prolonged periods in resting stages. Secondly, and of equal importance in the Great Lakes, sediment is a traditional pollutant which can be linked to violations of water quality standards. Sediment discharged in any significant quantities will increase turbidity, decrease the size of the photic zone, and result in increased benthic embeddedness. Though the sediment collected on the bottom of ballast tanks likely settled from waters drawn into the ballast tank, the characteristics of that sediment can be substantially altered from when it was taken onboard the vessel due to other constituents of ballast water and chemical changes in the ballast water tank. Furthermore, the sediment is not always from the same location or waters where the ballast water was taken onboard the vessel as the tanks are not completely emptied when ballast water is discharged. Therefore, EPA determined not to authorize the discharge of sediment from cleaning of ballast tanks anywhere in waters subject to this permit including the Great Lakes. EPA believes it is feasible to remove accumulated sediments from ballast tanks without flushing them into waters subject to this permit, and has received not information suggesting that this requirement has posed a problem in complying with the 2008 VGP.

4.4.3.4 Mandatory Ballast Water Management Practices for "Lakers"

In the 2011 Draft VGP, EPA had proposed that due to their special characteristics (see section 4.4.3.5.6.3 of Fact Sheet for the 2011 draft VGP), existing bulk carriers confined exclusively to the Great Lakes upstream of the Welland Canal ("Confined Lakers") would not be required to meet the effluent (and related) limits in section 2.2.3.5 of the VGP during the term of the VGP. During the comment period on the draft VGP, the some commenters provided information demonstrating that vessels confined to the Great Lakes, but which operate beyond the Welland Canal, share such characteristics (e.g., high ballast water flow rates, short term voyages, uncoated ballast tanks, challenges of finding ballast water treatment systems suitable for freshwater, plus have even more confined space for fitting equipment), and thus should be treated the same as was proposed for "Confined Lakers." In light of these comments, EPA has revised the final VGP to eliminate the confined vs. unconfined Laker distinction by adopting a definition of "Laker" to encompass existing bulk carriers that operate exclusively on the Laurentian Great Lakes, regardless of whether their operation is or is not beyond the Welland Canal.

As a result, "Lakers" meeting the final VGP definition, would not be required to meet the effluent (and related) limits in section 2.2.3.5 of the VGP, as their special characteristics render treatment technologies or other strategies to meet the limits currently unavailable and economically unachievable. However, because they share similar characteristics, all such "Lakers" would be subject to the three ballast water management measures that the draft VGP had proposed to apply only to "confined Lakers." EPA has established three ballast water management measures specific to existing bulk carrier vessels (commonly known as Lakers) built before January 1, 2009. These include developing sediment management measures, minimizing the amount of ballast taken in nearshore environments, and requiring inspection of sea chest screens and repair as necessary. EPA has found these requirements to be available and economically achievable, as they represent simple to implement and common sense approaches to managing ballast water discharges for these vessels to minimize the spread of ANS.

The first management measure requires the vessel owner/operator to annually assess sediment accumulations and document their sediment-related activities (to assure they are managing sediment effectively and to assure compliance with permit conditions). The second measure, adopted from voluntary Laker BMP approaches to mitigate the transfer of invasive species, requires that Lakers minimize the amount of water they take on in nearshore environments (for an example of voluntary Laker BMPs, see Great Lakes Maritime Industry Voluntary Ballast Water Management Plan for the Control of VHS, available in the docket for today's permit). The third measure requires that Lakers ensure that their sea chest screen(s) are adequately maintained. These screens will keep out the largest living organisms, such as fish, from ballast tanks (and bacteria and viruses associated with those larger organisms), which may reduce the risk of transferring ANS. Lakers confined exclusively to the Great Lakes upstream of the Welland Canal are laid up or put in drydock every winter; hence, they have the time and opportunity to inspect and repair sea chest screens, and replace as necessary. EPA believes that adequately maintaining sea chest screens is a simple and economically available technology-based requirement to reduce the threat of ANS dispersal within the Great Lakes.

For the reasons described in section 4.4.3.5 of this fact sheet, if existing Lakers are retrofitted to meet the treatment requirements in Part 2.2.3.5 of the VGP, these vessels are not required to meet the other requirements of Part 2.2.3.4 of the VGP. However, existing Lakers with ballast water treatment systems would still be required to meet the BMPs for ballast water management found in Part 2.2.3.3 of the VGP that are applicable to all vessels.

4.4.3.5 Ballast Water Treatment Measures

In developing today's numeric effluent limits, EPA considered data from numerous peer reviewed publications, literature produced by the federal government, other technical reports and publications, public comments, and comments from experts working in the field (see EPA SAB, 2011; ABS, 2010; Albert et al., 2010; CSLC, 2010; Dobroski et al., 2011; GLBWC, 2010; Lloyd's List, 2010; WDNR, 2010). The data sources from which EPA derived information for decision-making purposes are included in the docket for the permit and/or referenced in this fact sheet. These data sources discuss ballast water discharges, technologies available for the treatment of these discharges, and the effectiveness of the technologies. EPA considered these data in selecting the best practicable technology (BPT) and best available technology economically achievable (BAT) for today's permit. The permit includes numeric limits for ballast water discharges and provides vessel owner/operators options for determining how they will meet those limits. Not all vessels will use onboard treatment systems to comply with discharge requirements. Estimates developed by King et al. (2010) suggest that less than half of the vessels with ballast water discharge are likely to install onboard ballast water treatment systems. Some vessels are more likely to use an alternative ballast water management approach, including not discharging ballast water while in waters subject to this permit, using onshore facilities, or using potable water as ballast.

4.4.3.5.1 Ballast Water Management Using a Ballast Water Treatment System

Based on EPA's review of available data, EPA has established technology-based numeric effluent limits for the discharge of living organisms equivalent to the U.S. Coast Guard discharge standard (USCG, 2012, 33 CFR 151.1511 and 151.2030), which is equivalent to the standard set forth in Regulation D-2 of the International Ballast Water Convention (IMO, 2008) (henceforth referred to as the International Maritime Organization (IMO) standard). [11] EPA has established the VGP permit limits because several treatment technologies have been shown to be safe, reliable and effective at reducing viable living organisms in ballast water discharges to meet these limits. Furthermore, it has been demonstrated that several of these technologies are commercially available for shipboard installation and their use is economically achievable. Several studies and publications are available that discuss current treatment technologies, their efficacy and performance, and whether they are commercially available for shipboard installation (see EPA SAB, 2011; ABS., 2010; Albert et al., 2010; CSLC, 2010; Dobroski et al., 2011;

[11] Note that three size groupings addressed in section 2.2.3.5 effluent limits are (or include): (1) macrofauna/zooplankton, (2) phytoplankton, and (3) indicator microbes.

GLBWC, 2010; Lloyd's List, 2010; WDNR 2010). Establishment of a ballast water discharge limit at the U.S. Coast Guard /IMO discharge standard will result in a substantial reduction in the concentration of living organisms in the vast majority of ballast water discharges, compared to discharges of ballast water managed by mid-ocean exchange or discharges of unexchanged ballast water. In addition, EPA believes that no existing ballast water treatment systems are widely available for inland or seagoing vessels smaller than 1600 gross registered tons. Hence, inland or seagoing vessels smaller than 1600 gross registered tons are not required to meet the numeric ballast water effluent limitation. However, these vessels must meet all other ballast water requirements found in Part 2.2.3 of the VGP as applicable.

The CWA is a critical tool in forcing the development and installation of environmentally beneficial technologies. The statute demands application of best available technology economically achievable, which will result in "reasonable" progress toward the goal of eliminating the discharge of all pollutants, CWA section 301(b)(2)(A). Hence, EPA has established the ballast water discharge limit at the Coast Guard Phase I discharge standard/IMO standard with a rolling implementation schedule, similar to that established by the USCG proposal and IMO. Furthermore, EPA notes that as technologies improve and better data on the efficacy of systems become available, the Agency fully expects to make the BAT limit more stringent in the future, in line with the capabilities of treatment systems and the capability of testing protocols to establish that systems can achieve these limits. EPA also notes that not all vessels that are required to meet such numeric effluent limitations will need to do so as of the effective date of the permit, and will instead be required to meet other non-numeric BAT requirements established for their ballast water discharges upon the permit's effective date. EPA has found that sufficient numbers of treatment systems meeting today's limits will not be available for all vessels by the issuance date of this permit. Furthermore, requiring all vessels to install treatment systems immediately upon the effective date of the permit would not be economically achievable, and therefore does not represent BAT. See discussion below.

<u>Finding that the Ballast Water Limits in this Permit Represent the BPT and BAT Level of Control</u>

Ballast water discharge is a known vector for the spread of invasive species. The risk of establishment of ANS is assumed to decrease with decreasing propagule supply, although the exact quantitative relationship between propagule supply and invasion risk is unknown for any species, and in fact likely varies for any species over time and location. This assumption regarding risk is supported by a wide body of empirical, theoretical, and experimental evidence showing that invasion success increases with an increase in propagule supply, either by a higher concentration of organisms in an inoculation and/or by an increase in the frequency of inoculations (e.g., Simberloff, 1989, 2009; Ruiz et al., 2000a; Kolar and Lodge, 2001, Ruiz and Carlton, 2003; Lockwood et al., 2005; Johnston et al., 2008). Significantly reducing propagule pressure will reduce the probability of invasions, when controlling for all other variables (NAS, 2011). The ballast water discharge standard in today's permit will reduce discharges of living organisms, thereby reducing risk of the spread of aquatic nuisance species.

The living organism discharge standard for ballast water is expressed as concentrations of organisms per unit volume by organism size class. The numeric limitations in today's permit represent the most stringent standards that ballast water management [treatment] systems currently safely, effectively, credibly, and reliably meet (US EPA SAB, 2011).

In the context of this general permit, EPA has determined that the ballast water discharge standard represents the best practicable technology (BPT) for all pollutants, the best conventional technology (BCT) for conventional pollutants, and the best available technology economically achievable (BAT) for toxic and non-conventional pollutants. In making this determination, EPA evaluated effluent limits using a BPT and a BAT standard, but since conventional pollutants will also be adequately controlled by these same effluent limits for which EPA applied the BPT and BAT tests, EPA determined that it was not necessary to conduct BCT economic tests.

Ballast Water Treatment is Technologically Available

EPA developed the BPT/BAT numeric discharge limitations for ballast water based on an assessment of the demonstrated performance of current ballast water treatment technologies. Based upon available data, EPA's Science Advisory Board (2011) determined that five ballast water treatment system types (listed below) have been demonstrated to meet the IMO D-2 discharge standard, when tested under the IMO G8 guidelines for approval of ballast water treatment systems (MEPC, 2008), and will likely meet USCG Phase 1 standards (if tested under EPA's more detailed Environmental Technology Verification (ETV) Protocol).

These five types of ballast water treatment technologies include:

- Deoxygenation + cavitation;
- Filtration + chlorine dioxide;
- Filtration + UV;
- Filtration + UV + TiO_2; and
- Filtration + electro-chlorination.

Deoxygenation is a physical-chemical process that kills organisms by creating severe hypoxia (through lowered pressure via venturi or vacuum or lowered partial pressure via sparging with inert gasses). Cavitation is a physical process that kills organisms by the high pressure, shear forces, and shock waves generated by the collapse of micro-vapor bubbles induced into the ballast water. Filtration accomplishes a variety of physical separation processes, including screening to remove sediment and larger organisms resistant to disinfection, reduction of organic matter to reduce oxidant demand, and reduction of turbidity to increase transmittance of UV radiation (EPA SAB, 2011). Chlorine dioxide and electro-chlorination disinfect ballast water using the chemical disinfectants chlorine dioxide and hypochlorite. In the latter, hypochlorite is generated by electrolytic processes using sea water as the source of ions. UV is a physical-chemical process that disinfects ballast water using photochemical reactions generated by ultraviolet light radiation. In the UV + TiO2 physical-chemical process, UV light also activates the surface of the titanium catalytic semiconductor, disinfecting ballast water using both photochemical and photocatalytic reactions.

In conducting its study, EPA's SAB (2011) used the following criteria to determine that the five ballast water treatment technologies were available and demonstrated to meet the standard in today's permit:

- The technical literature supported the fundamental use of the technology (*e.g*., is it well documented that using the approach will safely and effectively remove, kill, or inactivate aquatic organisms).
- Laboratory testing was conducted with "reasonable and appropriate methods" (*i.e.*, methods commonly used in aquatic studies or alternative methods that appear rigorous and equivalent to a standard, common approach).
- Land-based testing was conducted with appropriate sample numbers and sizes; sample collection and handling were appropriate and documented; analytical facilities were adequate; IMO or ETV (v. 5.1) challenge conditions were met; appropriate toxicological studies were conducted and demonstrated environmental safety; a QA/QC policy was in place and followed; and ultimately, land-based testing produced credible results.
- Shipboard testing was conducted with the same considerations as land-based testing (described above) and produced credible results.
- If an active substance was included, the technology had credible toxicity and chemistry data and had received IMO Basic approval or Final Approval (which requires Basic Approval).[12]
- The technology had a type approval certificate from a flag administration.[13]
- The technology was in operational use (i.e., not used only during shipboard type approval testing) on one or more active vessels. (US EPA SAB, 2011)

EPA notes that other types of ballast water treatment systems may also meet these standards. However, the SAB panel determined that adequate data about these systems were not available for use by the panel to evaluate those systems. 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).

As of the 64th meeting of the Marine Environment Protection Committee (MEPC) at IMO, 28 systems had been type approved by their flag administrations.   MEPC 64/23 at ¶ 2.12. Based upon information generated by those system vendors and data regarding system

[12]Under Regulation D-3(2) of the IMO Ballast Water Management Convention, ballast water treatment systems that make use of "active substances" (biocides or other potentially harmful substances) are subject to approval by the IMO's Marine Environment Protection Committee (MEPC) with respect to active substance-related health, environmental, and safety issues. This review and approval is conducted under the G9 Procedure for approval of Ballast water management systems that make use of active substances " developed by MEPC, available at http://www.regulations.gov/search/Regs/home.html#documentDetail?R=09000064807e890e.

[13] EPA notes that in addition to measuring environmental efficacy (e.g., how well do systems prevent the discharge of living organisms), type approval involves evaluating the system's design and construction for operation on ships, the manufacturing standards, and safety aspects.

performance generally taken by third parties, those flag administrations believe that these systems can consistently meet the IMO D-2 discharge standard when installed and used on ships under normal operating conditions. Examples of data available to evaluate the efficacy of ballast water treatment systems include Cangelosi, 2010a; Cangelosi 2010b; Gollasch, 2011; Tamburri and Ruiz, 2005; ten Hellers et al.,2009; USCG, 2008; Veldhuis et al., 2008; Veldhuis et al., 2009a; Veldhuis et al., 2009b; Wright, 2009.

Based on EPA's review of available data public comment, the Agency agrees with the SAB's evaluation that ballast water treatment systems are available which meet the limits in today's VGP, and that at least five types of treatment technologies are available to meet those limits. Combining EPA's review with that of the SAB and other evaluations of available technology (see US EPA SAB, 2011; GLBWC, 2010; Albert et al., 2010; CSLC, 2010; Dobroski et al., 2011; Lloyd's List, 2010; WDNR, 2010) and the fact that numerous BWTS have been type approved by their flag administrations, EPA believes that effective technologies which meet today's technology based standards are or will be available for most types of vessels.

Ballast Water Treatment Requirements in the 2013 VGP are Economically Practicable and Economically Achievable

The US Coast Guard estimated the cost of requiring ballast water treatment systems for its March 2012 final rulemaking. The Coast Guard's Regulatory Analysis, available in the docket for today's permit, estimates the average capital cost of ballast water treatment systems that will be installed to meet their Phase I/ IMO D-2 standards. As determined by the USCG in their analysis of the March 2012 rulemaking, an estimated 1,459 domestic flagged vessels are expected to install BWTS through 2018 at costs that range from $258,000 for chemical application in offshore supply vessels to more than $2.5 million to retrofit Very Large Crude Carriers (VLCCs) with ozone generating systems. USCG estimated the total annual cost for the rule at $90 million (at 3 percent discount rate, in 2007 dollars).Capital costs primarily vary with pumping capacity and technologies utilized, but are also slightly influenced by differences between the vessel categories.

For purposes of evaluating and determining BAT, EPA has found that requiring installation of ballast water treatment will impose no incremental cost to the regulated community over meeting the US Coast Guard standards. The US Coast Guard rulemaking requires ballast water treatment systems be installed on the same schedule as today's final permit.

EPA believes that installation of ballast water treatment systems is economically practicable and achievable even if costs are fully attributable to this permit alone. This determination considers the full installation and operation cost (as summarized in the discussion of the USCG's cost estimates above and the economic analysis document that accompanies this permit) of ballast water treatment systems on applicable vessels. It also considers revenue for the vessels. For example, as reported in section 3.4.2 of EPA's economic analysis document, average daily charter rates for vessels ranged from $17,000 to $37,500 per day in 2006 (USCG, 2008) and averaged $15,179 per day per voyage in 2010.

EPA further notes that numerous publications and forums have been devoted to the imminence of the IMO standards, the availability of ballast water treatment systems, and the selection of those systems by vessel owner/operators (e.g., see ABS 2010; Lloyds 2010; Lloyds 2011; USCG 2009). Hence, EPA believes that vessel owner/operators have been planning for the installation and use of ballast water treatment systems, or making other arrangements for ballast water management as appropriate, and they have factored these costs into their long-term operating plans.

EPA has determined that a more rapid implementation schedule than that in the U.S. Coast Guard final standard is not economically achievable at this time. As discussed in section 4.4.3.5.5 of this fact sheet, EPA has determined that it is not possible for all vessels equipped with ballast water tanks to install ballast water treatment systems by December 19, 2013 (for more information, see additional discussion in section 4.4.3.5.5). If EPA were to require treatment with ballast water treatment systems for all vessels on December 19, 2013, those vessels which would be unable to install systems due to these limitations would be unable to legally discharge ballast water, and therefore legally operate, in U.S. waters as of that date. Those vessel owner/operators without ballast water treatment systems would face the unenviable choice of ceasing operation in US waters or knowingly violating the CWA, which could carry significant civil and criminal penalties. In addition to significant costs for these vessel owner/operators, trade to and from US ports would suffer, resulting in widespread and significant disruptions in trade and economic activity.

EPA expects that production capacity will be available for the numbers of new vessels coming into service every year and new build vessels are in the shipyard or drydock for a substantial portion of their construction which will allow them to install ballast water treatment systems before coming into service. Furthermore, vessel owner/operators of new build vessels have been aware of impending ballast water treatment requirements for these vessels since the signing of the IMO ballast water convention. For these new build vessels, BAT will be the numeric effluent limitations associated with using a treatment device to meet IMO limits. However, as discussed above, it is not economically achievable for all vessels, including most existing vessels, to have ballast water treatment systems installed by December 19, 2013. Hence, BAT as of the effective date of this permit is use of a treatment system for new vessels built on or after December 1, 2013 and use of other narrative best management practices for existing vessels. By the end of the permit term, EPA expects a substantial portion of vessels operating in US waters, including most existing vessels, to be utilizing ballast water treatment systems, as it is not cost prohibitive to install ballast water treatment systems when a vessel is in drydock or out of service, and phasing the installation of systems over time will allow the shipping industry to spread costs over several years. The basis for the implementation schedule is discussed more fully in section 4.4.3.5.5 below.

Ballast Water Treatment Technologies have Acceptable Non-water Quality Environmental Impacts

In addition, EPA has considered the non-water quality environmental impacts, including energy impacts, of the ballast water discharge limitations required under this permit and finds that they are acceptable. Energy impacts result from energy requirements to operate the ballast water treatment equipment such as pumps, filters, UV lamps, chemical generators, and gas spargers. EPA anticipates that the ballast water requirements of this permit may also result in an increase in fuel usage; however, EPA expects an offsetting decrease in fuel usage for those vessels which no longer have to conduct ballast water exchange (and must conduct it under the 2008 VGP). Additionally, owner/operators of vessels may generate certain air emissions, such as greenhouse gases from incremental fuel consumption; however, EPA does not anticipate that ballast water treatment would result in solid waste impacts. The Agency concludes that the effluent reduction benefits for ballast water treatment far exceed the potential adverse effects from the increase in energy and fuel consumption and air emissions.

EPA's Consideration of Conclusions Found in the California State Lands Commission Ballast Water Treatment Report

EPA understands that some stakeholders may view the California State Lands Commission report titled "2010 Assessment of the Efficacy, Availability, and Environmental Impacts of Ballast Water Treatment Systems for use in California Waters" (CSLC, 2010; Dobroski et al., 2011) as providing justification for inclusion of treatment standard concentrations which are lower than those technology-based effluent limits included in the VGP (e.g., justification for setting the limits as 100 or 1000 times more stringent than IMO). As an interim standard (applicable until 2020), California has utilized a "no detectable living organism" approach for the largest size classes of organisms, with numeric standards for smaller size classes.

EPA believes that these California State Lands Commission (CSLC) reports, and their earlier versions, have served a role in consolidating summary data regarding the efficacy of ballast water treatment systems and drawing conclusions from those data where feasible. However, though some may view the CSLC report as justifying a more stringent standard than IMO, the methodology employed by the State of California is inconsistent with CWA requirements that must be applied by EPA in evaluating whether technologies are available to meet a given discharge limit. The CSLC report "examines treatment system performance data to determine whether or not systems have demonstrated the potential to comply with California's standards" (CSLC, 2010, 42). EPA understands that the CSLC defines a Ballast Water Treatment System as having the potential to comply with their performance standards if the system has at least one test (potentially of many) from either a land-based or shipboard test for which the measurement indicated compliance with the California standard. CSLC found that 8 systems have the potential to meet their standards under these evaluation criteria. California further notes that "three of eight systems show the potential to meet California standards under their additional more rigorous evaluation criteria. These three passed more than 50% of the time over multiple tests (3 or more) at either land or shipboard scale" (CSLC, 2010, 75-76). EPA notes that no systems had "no detects" in all sample tests. Hence, CSLC is very careful to note that several systems they evaluated have the "potential to meet" their discharge limits (for some discharge events) but that use of systems highlighted in the report in no way guarantees compliance with the "no detectable living organism" standard in California waters.

In its analysis of the data presented in the CSLC report, EPA concludes that those data are not adequate to determine whether any of the treatment systems can meet a significantly more stringent limit than those for this permit term. EPA believes that the data California reviewed for their evaluation of ballast water treatment systems were generally from tests to determine whether systems could meet the IMO limits, and do not have significant precision or resolution to detect efficacy significantly beyond those limits. As noted by the SAB, "current methods (and associated detection limits) prevent testing of BWTS to any standard more stringent than D-2 and make it impracticable for verifying a standard 100 or 1000 times more stringent." Hence, EPA does not believe that the report can be used to support the assertion that technologies are available to meet a limit 100 or 1000 times more stringent than IMO. In fact, until better shipboard testing methods are developed, there is no way to efficiently detect organisms present in low concentrations (e.g., at or below the IMO standard) from a shipboard discharge. This means that, in practice, the "no detectable living organism standard" required by California is no more stringent than the IMO standard at this time. This conclusion is supported by a recent NAS report, which states that the zero-detectable organism standard "is functionally defined by the ability to characterize concentrations of organisms at low densities" and that the exact California discharge standard "is largely undefined and contingent on sampling protocols" (NAS, 118).

4.4.3.5.1.1 Monitoring from Vessels Using a Ballast Water Treatment System

Pursuant to CWA section 308 and 402(a)(2), 40 § CFR 122.43(a), 40 § CFR 122.44(i), 40 CFR 122.45(e), 40 § CFR 122.48, and other applicable implementing regulations, the following requirements have been included in the permit, as discussed below.[14] The monitoring requirements in Part 2.2.3.5.1.1 of the permit apply to ballast water discharges from vessels employing ballast water treatment systems. Effluent samples for biological indicators (i.e., *E. coli* and enterococci), residual biocides and biocide derivatives must be collected during an actual ballast water discharge.

The monitoring is divided into three components. The first component, in Part 2.2.3.5.1.1.2, requires functionality monitoring to assure the system is operating as designed. Vessels conducting this monitoring also must adequately calibrate their equipment as required in Part 2.2.3.5.1.1.3. The second component, in Part 2.2.3.5.1.1.4 requires monitoring from all ballast water systems for selected biological indicators. The third component, in part 2.2.3.5.1.1.5 requires monitoring of the ballast water discharge itself for biocides and residuals to

[14] As described above, EPA developed today's ballast water monitoring requirements in accordance with, among other provisions, 40 CFR 122.44(i)(1)(i) & (ii) and 122.45(e). "Where applicable," sections 122.44(i)(1)(i) & (ii) require conditions imposing monitoring "to assure compliance with permit limitations" for "[t]he mass (or other measurement specified in the permit) for each pollutant limited in the permit" and "the volume of effluent discharged from each outfall." EPA notes that, for the reasons described above, with the exception of indicator organisms, living organism monitoring of vessel ballast water discharges, by mass or any other measure, is not required in this permit due to practical constraints on the ability to collect and analyzed the volumes of ballast water necessary to directly detect and quantify such organisms at the levels of concern. Such requirements, therefore, are not "applicable" to this situation and are not included in today's permit. As for 122.44(i)(1)(ii)'s requirement for monitoring of volume of effluent discharged, there are no limits on the volume of effluent in the permit and thus no monitoring is needed to assure compliance with permit limitations. Note that vessel owner/operators are nonetheless required to record the volumes of ballast water that they discharge in Part 4.3 of the permit. As for section 122.45(e), EPA did not consider the listed factors because they were not appropriate to the ballast water context; it would not be appropriate to limit the frequency of ballast water discharges due to their important functions regarding safety and stability of the ship and, as described more fully above, ballast water discharges are not conducive to limitations based on total mass or rates of discharge.

assure compliance with the effluent limitations established in part 2.2.3.5 of the permit, as applicable.

Studies have concluded that the reduced discharge of viable organisms capable of establishing a viable population of the organism in US waters invasive reduces the risk of invasions (NAS, 2011). Monitoring data on the efficacy of ballast water treatment technologies will help EPA and others understand whether the number of living organisms in discharges has been reduced. In addition, monitoring is needed to better understand whether new invasive species are introduced from ballast water and other ship-based sources. This monitoring information is needed to evaluate the long-term effectiveness of requirements for treatment of ballast water and other measures to reduce introduction of invasive species. To address these important data needs, EPA is working with the Federal Aquatic Nuisance Species Task Force to develop a national strategy to improve understanding of invasion dynamics.

The following sections provide an in-depth discussion of each component and the basis for the requirements:

4.4.3.5.1.1.1 Ballast Water System Functionality Monitoring

Measures of treatment performance for ballast water systems can include a variety of techniques. Today's permit relies on existing sampling methods to ensure that a ballast water treatment system is functioning as designed (and as such, is assumed to be effectively killing living organisms). Unfortunately, there are significant limitations which prevent the widespread direct detection and quantification of the two largest size classes of organisms regulated by today's VGP (see EPA, 2010; US EPA SAB, 2011; King and Tamburri, 2010; Lee et al., 2010; Miller 2011). This means that it is not practical or economical for all vessel owner/operators to directly evaluate whether a ballast water discharge from a given vessel is meeting the numeric limitations contained in Part 2.2.3.5 with currently available, validated methods. Hence, the monitoring requirements in the "ballast water system functionality monitoring" focus on physical/chemical indicators of treatment performance.

Physical/chemical indicators of treatment performance verify that the ballast water treatment system is operating according to the manufacturers' requirements. Most ballast water treatment systems have control and self diagnostic equipment such as sensors that continuously measure treatment parameters to verify performance. Sensors commonly incorporated into the most frequently installed systems include flow meters, pH sensors, dissolved oxygen sensors, OPR and amperometric (TRO) sensors, and on-line chlorine analyzers. All of these meters and sensors are widely available as they have broad application in the water and wastewater treatment industry and are available off-the-shelf from many major equipment suppliers. Other ballast water treatment systems are provided with testing meters or kits, such as portable chlorine and dissolved ozone monitors, to verify adequate levels of treatment chemicals are being maintained within the ballast tanks. Vessel operators monitor and record this data and make adjustments, maintenance, or repairs to the ballast water treatment system to ensure the equipment is functioning properly. For publicly available information which discusses the treatment processes used by various ballast water treatment systems, please see, e.g., ABS, 2010; Albert et al., 2010; and Lloyds, 2010.

Ballast water treatment systems are designed and manufactured with various sensors and other control equipment to automatically monitor and adjust system operating conditions to ensure proper operation and to alert vessel personnel when intervention, maintenance, or repair is required. Sensors and other control equipment, interfaced with monitoring equipment to record operating parameters, also help vessel operators determine data trends, while allowing EPA to verify that a system is operating as designed. The vendor's Operating and Maintenance Manual explains the applicable sensors and other control equipment for the ballast water treatment system and should specify requirements for maintaining those systems. They may also specify what constitutes a range of stable operating conditions for the system. Many ballast water treatment system manufacturers require that the BWTS monitoring and recordkeeping be operated continuously to assure the system is functioning as designed. EPA requires vessel owner/operators to operate the system according to such specifications. Appendix J in the permit contains all the treatment processes and required monitoring parameters that EPA believes are currently widely used in existing ballast water treatment systems. EPA expects that most ballast water treatment systems will incorporate multiple treatment processes (e.g., filtration plus electrochlorination). Based on ballast water treatment system status reported in Albert et al. (2010), the vast majority of systems use between two and four treatment processes. EPA expects that vessel owner/operators will only monitor for a subset of parameters contained in Appendix J in the permit that are for processes incorporated into the design of their ballast water treatment system.

When alarms are initiated or when sensors indicate the ballast water treatment system is not functioning properly, the vessel must not discharge ballast water. Ballast water discharge can resume only after correcting the problems with the system and reestablishing stable operating conditions.

Routine maintenance of the ballast water treatment system and troubleshooting procedures are typically clearly defined in the system's Operating and Maintenance Manual kept onboard the vessel. All maintenance activities related to the ballast water monitoring system and overboard discharge control unit must be recorded, and the information must remain on board the vessel for three years for inspection purposes. In addition, vessel staff training must include familiarization with the operation and maintenance of the ballast water overboard discharge control and monitoring equipment (see Part 2.2.3.1 of the permit). All ballast water treatment systems must be inspected on a monthly basis to determine both short-term and long-term maintenance needs as specified in the vendor's Operating and Maintenance Manual.

4.4.3.5.1.1.2 Ballast Water Monitoring Equipment Calibration

All applicable sensors and other control equipment must be calibrated as recommended by sensor and equipment manufacturers, or by ballast water treatment system manufacturers or when warranted based on device drift from a standard or calibrated setting. At a minimum, all applicable sensors and equipment must be calibrated annually, however EPA fully expects many sensor types (e.g., pH probes, TRO sensors, DO probes) will need to be calibrated on a more frequent basis. The vessel owner/operator must do so if specified by the probe or ballast water treatment system manufacturer. Calibration of the sensors and equipment can be conducted on-board the vessel or they can be removed and shipped to the manufacturer for calibration. For some probes, vessel owner/operators may want to switch out electrodes more frequently, e.g., once every four months, to maximize accuracy of their probes. During any period when the sensors are not installed and operating on the ballast water treatment system, the vessel must not discharge ballast water.

Ballast water treatment systems that are equipped with automated control systems that initiate a sequence to stop the overboard discharge of the effluent in the event of alarm conditions must be subjected to an annual functional test. The detailed program for a functional test of such equipment is typically developed by the manufacturer, taking into account the features and functions of the specific design of the equipment and the operating and discharge conditions monitored. A copy of the functional test protocol must be carried aboard the vessel at all times.

4.4.3.5.1.1.3 Effluent Biological Organism Monitoring

Biological indicator compliance monitoring sampling is intended to verify the treatment system is operating properly by collecting a small volume sample and analyzing the sample for concentrations of certain biological indicator parameters. Analysis of concentrations of indicator organisms must include at least *E. coli* and enterococci bacteria. Biological indicator compliance monitoring sampling of ballast water effluent must be conducted 2 times during the first year the system is installed or used for vessels with type approved devices for which high quality type approval data are available. For vessels with high quality data, if sampling results are below permit limits for two consecutive events, the vessel owner/operator may reduce monitoring to one time per year after the first year. However, if the vessel owner/operator exceeds a permit limit on any sampling event, they must return to monitoring two times per year until they have two additional results below permit limits. . For vessels for which high quality data are not available, monitoring must be conducted 4 times per year, no closer than 14 days apart on water treated during separate treatment episodes, to verify the system is operating properly. Records of the sampling and testing results must be retained onboard for a period of 3 years in the vessel's recordkeeping documentation consistent with Part 4.2 of the permit.

In March 2012, the USCG finalized its ballast water discharge standards and type-approval rulemaking (79 FR 17254, March 23, 2012). Under those final regulations, the USCG type-approval process in 46 CFR Part 162, Subpart 162.060 requires use of the EPA-ETV testing protocols (see e.g., 46 CFR 162.060-26; 162.060-28(f), (h), and (j)). Use of the ETV protocols will ensure any USCG type-approvals are based on high quality data. In addition, the USCG final rule provides for temporary use of "Alternative Management Systems, or "AMS" (33 CFR 151.1504 and 151.2026). To obtain a determination by the USCG that a system qualifies for treatment as an AMS, those regulations require the system to have received type-approval by a foreign administration, submission of full analytical procedures and methods, Quality Assurance procedures, and a type-approval application as described under 46 CFR 162.060–12, which in turn includes a requirement for a thorough explanation of how the submission meets or exceeds the requirements of Subpart 162.060 in respect to the ability to meet the discharge standard requirements. These requirements will ensure that systems with an AMS determination from the USCG are based upon high-quality testing data. Thus, systems which receive USCG type-approval or a USCG AMS determination will be considered to have high quality data and subject to the minimum 2 times in the first year (and 1 time per year thereafter if permit limits are met) biological indicator compliance monitoring sampling provisions of the VGP. Though systems with "high quality data" could include systems other than those having received U.S. Coast Guard type approval or a U.S. Coast Guard AMS determination, as a practical matter, EPA does not expect many, if any, other treatment systems to be considered to have "high quality data" without one of these two data quality control reviews. Table 2 in the permit lists the biological indicator compliance monitoring sampling analytical methods and effluent limits for treated ballast water. For today's permit, EPA has required monitoring of organisms in discharged ballast water, but has limited the scope of the organisms monitored to the bacterial indicators specified in the discharge standard. EPA has limited the scope of biological monitoring due to logistical constraints of conducting such monitoring. In particular, the collection of adequate representative samples for analysis of larger organisms, which can involve significant volumes of water (3-5 cubic meters), could be impractical during the intensive activities associated with conducting cargo operations (including the management of ballast water to adjust for changes in the amount and distribution of cargo within the ship) during relatively limited times during which vessels are at dock.

EPA has established effluent limits for three pathogen indicators: *Escherichia coli*, enterococci, and *Vibrio cholerae*, consistent with the US. Coast Guard Phase I standard. However, EPA notes that the Agency is requiring monitoring for *Escherichia coli* and enterococci but is not requiring monitoring for *Vibrio cholerae*. The Agency is not requiring monitoring for *Vibrio cholerae* because the Agency has found based upon conversations with several ballast water treatment system testing laboratories (e.g., Naval Research Lab, Maryland Environmental Resource Center, the Royal Netherlands Institute for Sea Research) that monitoring of this parameter would generally not result in the detection of the presence of this pathogen, even if the ballast water treatment system were not fully functional. Importantly, EPA also notes that Part 136 methods are not available for detecting *Vibrio cholerae* in wastewater. EPA is also requiring monitoring for total heterotrophic bacteria to establish better information about how bacterial communities respond to ballast water treatment. EPA has found this test to be affordable, and the sample can be collected at the same time other effluent samples are collected.

Effluent biological organism monitoring is required between once per year and four times per year, dependent on whether the system is a device for which high quality type approval data are available, as described above. For vessels with a ballast water treatment system for which high quality type approval data are available, EPA believes that requiring monitoring twice per year during the initial year of system use, and once thereafter (if permit limits are met) will assist in assuring that the system is being maintained and performing to reduce the concentration of living organisms in the discharge.

EPA expects that the vast majority of vendors will either get their systems type-approved by the US Coast Guard, receive a USCG AMS determination, or at minimum, will share their full type approval data packages with the US government during this permit term. Hence, EPA expects that there would be few, if any, systems in use in waters subject to this permit that do not have AMS or USCG type approval. However, EPA notes that some vendors and/or flag administrations have shown a reluctance to share necessary data. Lack of data availability has been noted as a significant impediment to effectively evaluating the efficacy of ballast water treatment systems (Albert, 2011; US EPA SAB, 2011). For those systems for which data are not fully transparent, EPA must receive a higher degree of assurance that the systems are functioning so that they are effective, and that they are effectively eliminating living biological organisms (to the extent allowed by existing testing methodologies). As a result, EPA has required monitoring on a more frequent basis for any ballast water treatment system for which adequate data (e.g., full data packages submitted to flag administrations) are not available. Hence, the monitoring frequency is increased to four times per year for vessels using a ballast water treatment system which full data are not available to the US EPA and the US Coast Guard.

EPA's SAB found that "Measuring adherence to a standard that is 10x more stringent may be possible if a continuously isokinetically taken representative sample is used" (EPA SAB, 2011, page 29). In addition, the SAB reported, "New or improved methods will be required to increase detection limits sufficiently to statistically evaluate a standard 10x more stringent than IMO D-2/Phase 1; such methods may be available in the near future." EPA is working with the Coast Guard to develop improved testing protocols that might establish whether treatment systems are able to remove organisms to a greater extent than the final standards. As part of this process, EPA, working through the ETV program, has a public participation process. The Agency encourages the participation of all interested stakeholders in order to best inform the Agency's decision making on developing new and updated testing protocols. The most recent version of the ETV Protocols (US EPA 2010) can be found at http://www.epa.gov/etv/vp.html. Information on EPA's ETV program can be found at: http://www.epa.gov/nrmrl/std/etv/index.html.

4.4.3.5.1.1.4 Authorization of Residual Biocides Associated with Ballast Water Treatment Systems

Many ballast water treatment systems produce or use biocides as an agent to kill organisms present in ballast water discharges. The definition section of the permit contains a definition of biocides subject to these provisions. Ballast water treatment systems that use biocides as active substances have the reasonable potential to cause or contribute to an excursion of applicable numeric and/or narrative criteria for the protection of aquatic life. EPA established the biocide effluent limitations contained within Part 2.2.3.5.1.1.5 of the VGP to ensure that such discharges are controlled as necessary to ensure compliance with applicable water quality standards, pursuant to 122.44(d)(1)(vi) and (vii).

EPA assumes that a subset of the BWTS installed use biocides as disinfection methods and would have the potential to discharge residual biocides and therefore be subject to the 2013 VGP requirements found in Part 2.2.3.5.1.1.5 of the Permit. According to Lloyd's Register (2011), about half of the 200 BWTS installed as of June 2011 use chemical disinfection methods that have the potential to discharge residual biocides.

EPA notes that this permit does not authorize the use of dispersants in the vessel owner/operators' ballast tanks which may remove the appearance of a visible sheen from the discharge.

The concern with respect to the aquatic environment is that if the treated ballast water contains biocides or their derivatives at levels that are still toxic at the time of discharge, then organisms in the receiving water may be harmed. Part 2.2.3.5.1.1.5 of the permit thus contains specific limitations with respect to discharges of biocides or their derivatives. The permit contains a requirement that any ballast water technology must not discharge (and therefore, must not use) any "pesticide" within the meaning of FIFRA unless the pesticide has been registered for use in ballast water treatment under such Act, or unless the pesticide is generated solely by the use of a "device," within the meaning of the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C.136 et seq. ("FIFRA"), on board the same vessel as the ballast water to be treated.

In addition, the permit contains specific limits for commonly used biocides in ballast water treatment systems. Chlorination (generally via hypochlorite electrolytic generation) is a commonly used disinfection technology and is known to be proposed for use in ballast water treatment systems. As in the 2008 VGP, the permit provides that Total Residual Chlorine (TRC) may not exceed 100 micrograms per liter (µg/l) as an instantaneous maximum. Routine methods for de-chlorination of treated water are well demonstrated, and in selecting this limit EPA considered existing TRC limits found in a number of NPDES permits for publicly owned treatment works, with the TRC limit for this permit reflecting the median limit for the permits reviewed.

For today's permit, EPA has also established a discharge limit for ozone, expressed as an instantaneous maximum 100 micrograms per liter (µg/l) of Total Residual Oxidizers (TRO as TRC). EPA requires analysis of TRO in ballast water effluent using either of two standard DPD colorimetric methods recognized in the international community: Standard Methods 4500-Cl G and International Organization for Standardization (ISO) Method 7379/2. Although these methods were originally developed to determine residual chlorine, many oxidants used as disinfectants react directly with the colorimetric indicator, thereby allowing for the determination of total residual oxidizers. Examples of detected oxidants relevant to ballast water treatment technologies include chlorine, chlorine dioxide, ozone, bromine, hydrogen peroxide, and disinfectant by-products such as chlorite and chlorate. Because the photometric equipment compares the colorimetric response of the sample to its calibration developed based on chlorine, results are reported as Cl2/L.

EPA has established a limit of 200 micrograms per liter (µg/l) of Chlorine Dioxide for systems using Chlorine Dioxide as a biocide. The manufacturer of one chlorine dioxide based system provided information on aquatic toxicity tests performed in support of achieving discharge approval from the Washington State Department of Ecology and GESAMP. These data were submitted to EPA in response to EPA's 2010 Federal Register notice seeking additional information for this permit. In its supporting documentation, the manufacture assessed chlorine dioxide effects on the survival and growth of silverside minnows (*Menidia beryllina*) and mysids (*Americamysis bahia*), survival and normal development for mussel (*Mytilus sp.*) and Pacific herring (*Clupea pallasi*) embryos, germination and germ tube length for giant kelp (*Macrocystis pyrifera*) zoospores, 96- hour population growth for diatoms (*Skeletonema costatum*), and 96-hour survival for Pacific herring larvae. They documented EC50 concentrations around 0.2 mg/L (equal to 200 µg/l) chlorine dioxide for the most sensitive test endpoints (i.e., mussel normal-survival, kelp germination, and kelp germ tube length). The manufacturer noted that the observed toxic thresholds were sharp and that the effects disappeared when concentrations reached 0.15 mg/L chlorine dioxide. Hence, based on these results, and to be consistent with recommendations made by GESAMP, EPA established the limit of 200 micrograms per liter (µg/l) of Chlorine Dioxide.

EPA has also included limits for Peracetic Acid at 500 micrograms per liter (µg/l) and Hydrogen Peroxide at 1000 micrograms per liter (µg/l) for systems using peracetic acid. Those limits were recently proposed by the GESAMP Ballast Water Working group for one ballast water treatment system which uses Peraclean (a peracetic acid based biocide). EPA notes that in low temperature, low salinity and/or low organic carbon concentrations, self-degradation of peracetic acid slows, maintaining ballast water effluent concentrations that are toxic to aquatic organisms (MEPC 54/2/12 Annex 5; de Lafontaine, 2006; MEPC 62.2). Effluent toxicity can be mitigated by using a chemical neutralization step (e.g., sodium sulfite addition) if natural degradation is not sufficient to reduce effluent concentrations of these active substances to the required limitations.

The permit further provides that in order to be eligible for coverage under the general permit, any other discharged biocides or derivatives (other than those listed above) may not exceed any recommended acute water quality criteria listed in EPA's 2009 National Recommended Water Quality Criteria and subsequent revisions published prior to issuance of today's permit. The 2009 National Recommended Water Quality Criteria can be found at http://water.epa.gov/scitech/swguidance/standards/criteria/current/upload/nrwqc-2009.pdf and any subsequent revisions may be found at http://water.epa.gov/scitech/swguidance/standards/criteria/current/ . Those numeric criteria were developed by EPA under authority of section 304(a) of the CWA based on the latest scientific information on the relationship that the effect of a constituent concentration has on particular aquatic species and/or human health. Normally, the CWA section 304(a) criteria are not regulations and do not impose binding requirements, but rather are information that EPA provides periodically to the states as guidance for use in developing numeric criteria for inclusion in State water quality standards under section 303 of the CWA. See 40 CFR 131.3(c). In this permit, however, EPA is using the CWA section 304(a) criteria as an end-of-pipe limitation because a variety of biocides might be proposed for use in ballast water treatments systems, and the section 304(a) criteria address a wide variety of chemicals, identifying numeric criteria intended to safeguard aquatic life and human health. Because the ballast water treatment systems subject to such limits are using biocides, which by definition are intended to be applied at levels that are toxic to organisms (in ballast water), EPA believes that such compliance is appropriate for use as a permit condition for coverage under this general permit.

Because an exceedance of the effluent limits in Part 2.2.3.5 of the permit is a permit violation, if vessel owner/operators are concerned that that their discharges from vessel discharges might exceed these limits, they are encouraged to first conduct land-based testing before installation on a vessel.

4.4.3.5.1.1.5 Residual Biocide or Derivative Monitoring

While ballast water treatment technologies reduce the probability of invasion, such treatment may introduce other water quality impacts, such as toxicity. For example, the addition or in-process generation of disinfecting chemicals may result in an effluent with some residual toxicity. Depending on the predicted or measured oxidant levels in the ballast water, a chemical neutralizing agent may be applied before ballast water discharge.[15] Use of chemical biocides also has the potential for generation of disinfection by-products, such as trihalomethanes and haloacetic acids. Currently available technologies use chemical neutralization or other means to mitigate residuals, but are not able to reduce disinfection byproducts of concern once created.

Based upon the potential discharge of residual biocides, EPA has incorporated monitoring requirements for both type approved ballast water treatment systems and experimental ballast water treatment systems which use an active substance in Part 2.2.3.5 of today's permit. For vessels having ballast water treatment systems that either add or generate biocides for treatment (e.g., chlorine, chlorine dioxide, ozone, etc.) the vessel must conduct monitoring of the vessel ballast water discharge for any residual biocides to demonstrate compliance with the limits provided in Table 5. For example, if chlorine biocide is used in ballast water treatment, the vessel owner/operator must test four times per year for residual chlorine in the vessel ballast water discharge. All sampling and testing for residual biocides shall be conducted using sufficiently sensitive 40 CFR Part 136 methods or other methods if specifically listed. If methods for a particular residual biocide are not available in 40 CFR 136, then another method may also be used (e.g., ISO methods). Sensors or other test equipment that continuously monitor residual biocide in ballast water discharge must be sufficiently sensitive to measure biocide concentrations before and after any neutralization process to verify discharge concentrations and to control the neutralizer dose.

If a ballast water treatment system uses a biocide not listed in Table 3, the residual biocide may not exceed acute water quality criteria listed in EPA's 2009 National Recommended Water Quality Criteria, and any subsequent revision, at the point of ballast water discharge.[16]

As with biological monitoring, EPA has required different monitoring frequencies for vessels utilizing a ballast water treatment system where high quality type approval data are available to the US EPA and the US Coast Guard. As previously discussed, EPA expects that the vast majority of vendors will either get their systems type approved by the US Coast Guard, or at minimum, will share their full type approval data packages with the US government during this permit term. For those systems, EPA has required that the vessel owner/operator must initially take at least three (3) samples on different days from different treatment episodes over a 180-day period that are representative of the treated ballast water discharge. This is required to demonstrate that residual biocides are in compliance with the permit effluent limits and/or to generate information for EPA which will assist the Agency in evaluating whether certain biocides or their byproducts are likely to cause or contribute to a violation of water quality standards. Each sample must be tested independently and the individual results must be reported and not averaged. Samples must be tested as soon as possible after sampling, and may not be held longer than recommended by the test method for each tested constituent. Thereafter, the vessel must conduct maintenance sampling and analysis for residual biocides at least two (2) times per year of the vessel ballast water discharge to demonstrate continued compliance with

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[15]USEPA, Science Advisory Board (SAB), Ecological Processes and Effects Committee, Efficacy of Ballast Water Treatment Systems, June 2011.

[16] USEPA, National Recommended Water Quality Criteria , 2009. http://water.epa.gov/scitech/swguidance/standards/criteria/current/upload/nrwqc-2009.pdf.

effluent limits and to produce information regarding the continuing performance of the systems and how they might impact the aquatic environment.

For those systems for which high quality data are not fully available to EPA and the Coast Guard, EPA must receive a higher degree of assurance that the systems are functioning effectively so that they are not releasing harmful quantities of residual biocides or byproducts into the aquatic environment. As a result, EPA has required monitoring on a more frequent basis for any ballast water treatment system for which adequate data (e.g., full data packages submitted to flag administrations) are not available. Hence, vessel owner/operators employing these systems must initially take at least five (5) samples on different days from different treatment episodes over a 180-day period that are representative of the treated ballast water discharge. Each sample must be tested independently and the individual results must be reported and not averaged. Samples must be tested as soon as possible after sampling, and may not be held longer than recommended by the test method for each tested constituent. Thereafter, the vessel must conduct maintenance sampling and analysis for residual biocides at least four (4) times per year of the vessel ballast water discharge to demonstrate continued compliance with the effluent limits.

For all ballast water treatment systems, the minimum time period between ballast water sampling events for residual biocides cannot be less than 14 days. EPA has required a minimum time of 14 days between sampling events to assure that the system is performing over time during a given a year. EPA is not requiring monitoring on specified schedule (e.g., once per quarter) because ballast water discharge events might be episodic for some vessel owner/operators, and EPA wanted to provide flexibility to vessel owner/operators as to when they could collect samples. For vessels that only enter U.S. waters on a limited basis (i.e., one time per year or less), the vessel must have conducted ballast water monitoring for residual biocides within the previous year and upon discharge into U.S. waters. If any of the initial or maintenance samples exceed the effluent limits specified in Part 2.2.3.5.1.1.5 of the VGP, the vessel owner/operator must immediately cease discharging from the treatment system and undertake steps necessary to achieve compliance.

Biocides can also generate derivatives in ballast water that have aquatic toxicity when released to the environment. For example, chlorine combined with organic material can generate short chain volatile hydrocarbons (e.g., trihalomethanes). In addition to monitoring for the biocide, vessels must also conduct ballast water effluent sampling for biocide derivatives on the same schedule discussed above. The minimum time period between sampling ballast water sampling events for biocide derivatives cannot be less than 14 days.

4.4.3.5.1.1.6 Use of Biocides not Specifically Addressed in Part 2.2.3.5.1.1.1 of the Permit

The list of specific biocides authorized in section 2.2.3.5.1.1.1 of the permit, including Table 5 of the permit and those listed in the 2009 National Recommended Water Quality Criteria and subsequent revisions published prior to issuance of today's permit, contains most biocides, and/or the derivatives from such biocides, currently in use or potentially to be used in ballast water treatment systems of which EPA is aware. If after permit issuance, a biocide and its derivatives used or produced by a BWTS are not listed in section 2.2.3.5.1.1.1 or found in 2009 National Recommended Water Quality Criteria and subsequent revisions published prior to issuance of today's permit., the permit provides that a vessel owner or operation must notify EPA at least 120 days in advance of its use and provide any associated aquatic toxicity data for that biocide or its derivatives of which they are aware. EPA may impose additional limitations on a vessel specific basis, or require the owner/operator to obtain coverage under an individual permit, if necessary. EPA may inform the vessel owner / operator of specific requirements. You may not discharge the biocide at issue until you receive a response from EPA to your notification.

EPA notes that the 2008 VGP included an alternative requirement for Whole Effluent Toxicity (WET) testing for experimental ballast water treatment systems using biocides, or which have derivatives from such biocides, for which there are not acute water quality criteria available. In today's permit, EPA has removed the requirement for certain vessels that employ ballast water treatment systems to perform WET testing. This provision of the 2008 VGP was only used by one vendor to date, and EPA expects that such circumstances are expected to be similarly rare in the 2013 VGP. Given this, EPA believes a vessel-specific approach is more appropriate.

4.4.3.5.1.1.7 Ballast Water Treatment System Recordkeeping and Reporting

Part 2.2.3.5.1.1.6 of the permit addresses recordkeeping and reporting for vessels utilizing shipboard ballast water treatment systems. These provisions were included to ensure that the vessel owner/operator complies with the limits previously discussed for section 4.4.3.5 of this fact sheet.

Like all other records required by the VGP, all records of monitoring must remain onboard the vessel for a minimum of three years and be available for inspection. Documentation regarding ballast water treatment system sensor and other control equipment calibration must also remain on the vessel for a minimum of three years and be made available for inspection by EPA or USCG. Ballast water monitoring data (including treatment system monthly inspection records and equipment calibration records) may be kept in any form, including electronic form, provided they can be made available to the EPA and meet the requirements of Part 1.14 of the permit. Records of monitoring shall include:

- The ballast water treatment system used, its type approval certificate, and records of whether the system is a vessel with type approved devices for which high quality type approval data have been made available;
- The individual(s) who performed the sampling, measurements, and/or inspections;
- The date(s) analyses and/or inspections were performed,
- Any sensor or other control equipment calibration and functional tests conducted during the inspection as applicable;
- The techniques or methods used for any sensor or other control equipment calibration and functional tests as applicable;

- The date and time of all monitoring results (monitoring in Parts 2.2.3.5.1.1.1, 2.2.3.5.1.1.2, 2.2.3.5.1.1.4, 2.2.3.5.1.1.5 as applicable);
- The analytical techniques or methods used as applicable, and
- The results of such analyses.

Monthly sensor or other control equipment measurement records must be submitted to EPA as part of the vessel's annual report on ballast water management. EPA found that monthly monitoring is necessary to assure that systems are functioning as designed. Due to the rigorous land based and shipboard testing these systems generally must undergo before they are installed onboard vessels, EPA believes that monitoring the functional parameters on a monthly basis provides a basic level of assurance that the systems are effectively treating the ballast water discharge and removing living organisms to the extent necessary to meet the effluent limits specified in this permit. The biological effluent monitoring of indicator organisms provides EPA added assurance (within the limits of what is feasible with today's monitoring technologies) that these systems are effectively killing living organisms before discharge. Furthermore, considering the nature and effect of ballast water discharges, EPA has determined that annual reporting of these monthly and other monitoring results is appropriate. See 40 CFR 122.44(i). There is no need for EPA to require reporting of monitoring results more frequently than annually, as the monitoring requirements are primarily imposed to ensure that the owner/operator is aware of system malfunctions and, per section 3.2 of the permit, takes necessary corrective action.[17]

4.4.3.5.2 Onshore Treatment of Ballast Water

For those vessels whose design and construction safely allows for the transfer of ballast water to a third party (which may be an onshore facility or on another vessel such as a treatment barge), if such treatment for ballast water is available, practicable and economically achievable, the vessel owner/operator may use this treatment for any ballast water discharges, and thus not discharge ballast water to waters of the US.

Any vessel owner/operator covered by this permit discharging ballast water to a facility onshore or to another vessel must ensure that all vessel piping and supporting infrastructure up to the last manifold or valve immediately before the dock manifold connection of the receiving facility or similar appurtenance on a reception vessel prevents untreated ballast water from being discharged into waters subject to this permit.

Discharges containing ballast water from a vessel covered by this permit by an onshore facility or from another vessel not covered by this permit, must be authorized by an NPDES permit issued by the NPDES permit authority responsible for the waters to which the discharge

[17] Information that a system is not running as designed would likely tell EPA nothing about how many living organisms were released during a given time period and thus their invasion potential and therefore would be of limited use to the Agency if such information were required to be submitted to the Agency on a more frequent basis. What is important here is that the Agency knows that when the system was found to be malfunctioning, the owner/operator took necessary corrective action. This is information that will be submitted to the Agency in the annual reports and thus could form the basis for any necessary enforcement action.

occurs (i.e., the state in most cases[18]). EPA recommends that permitting authorities include conditions in the permit providing for treatment to remove living organisms at least as protective as the standards adopted in Part 2.2.3.5 or any subsequent VGP ballast water limits. EPA notes that it has the authority to object to proposed state permits if limits are not in compliance with the CWA (CWA section 402(d)) and intends to work with states, as appropriate, as they develop such permits.

While EPA believes that shipboard treatment of ballast water is an essential part of the solution to ballast water management for much of today's fleet, considering their operations, use of onshore treatment systems, if available (e.g., compatible with the vessel), could be a valid and effective form of ballast water treatment. EPA's SAB concluded that ". . . use of reception facilities may enable ballast water discharges to meet a stricter standard." (US EPA SAB, 2011, page 8). EPA is unaware of any such onshore treatment facilities capable of meeting the VGP's 2.2.3.5 ballast water standards currently available in the U.S. (US EPA SAB, 2011).

The potential advantages of onshore treatment facilities over shipboard treatment include: fewer onshore facilities than shipboard systems would be needed; smaller total treatment capacity would be needed; and onshore facilities would be subject to fewer physical restrictions, and would therefore be able to use more effective treatment technologies and processes than those used for shipboard treatment (US EPA SAB, 2011). Some studies conclude that onshore treatment facilities are a technically feasible option for either the industry as a whole or for some part of the industry (Pollutech, 1992; NAS, 1996; Oemke, 1999; CAPA, 2000; California SWRCB, 2002; Brown and Caldwell, 2007, 2008). Others conclude that cost or other factors could limit their use to part of the industry (Victoria ENRC, 1997; Dames & Moore, 1998, 1999; Rigby & Taylor, 2001a, b; California SLC, 2009, 2010).

Implementing a national U.S. and international network of onshore reception facilities presents many challenges. The most significant challenge is ensuring the availability of onshore treatment facilities at all ports of call, because if even one anticipated port location for a vessel does not have onshore treatment, that vessel may need to install a shipboard treatment system, defer the discharge of ballast water, or decline to call at that port. Another critical challenge is retrofitting vessels with the appropriate pipes and pumps to move ballast water up from tanks and off the ship at a rate fast enough that the vessel can perform cargo operations without significant and costly delays. Finally, onshore treatment facilities may not provide a complete solution to ballast water treatment. For example, some vessels may need to discharge part of their ballast water before arriving at berth so they can conduct cargo operations as soon as possible following arrival at the dock (AQIS, 1993a; Oemke, 1999; Cohen & Foster, 2000; CAPA, 2000; Rigby & Taylor, 2001a); some vessels need to discharge ballast water to reduce draft before arriving at berth (Cohen, 1998; Dames & Moore, 1998, 1999; Oemke, 1999; CAPA, 2000, Rigby & Taylor, 2001a; California SWRCB, 2002; California SLC, 2010); and lightering vessels may need to discharge ballast as they load cargo at designated anchorages or lightering

[18] As explained more fully in sections 3.1 and 3.5.2.1 of this fact sheet, while EPA retains the authority to permit discharges incidental to the normal operation of vessels formerly subject to the exclusion from NPDES permitting at 40 CFR 122.3(a) regardless of the NPDES authorization status of a state, onshore treatment facilities and treatment barges were never within the scope of that exclusion, as onshore facilities are not "vessels" and treatment barges operate in a capacity other than as a means of transportation.

zones (CDR Gary Croot, U.S. Coast Guard, pers. comm.; National Ballast Information Clearinghouse data).

However, onshore treatment of ballast water has been used in the past to remove oil from certain ballast water discharges from certain vessels (e.g., to prevent the discharge of oily ballast water from single hull tanker vessels). Use of these facilities, with modifications made specifically to remove living organisms (e.g., filtration with second stage disinfection) might make operational sense for vessels sailing dedicated routes. For example, an oil tanker engaged in the Coastwise trade which only deballasts in the same Alaskan waters, may elect to utilize onshore treatment if a facility is available. However, should this vessel be shifted to a different route and need to deballast, they will be responsible for finding onshore treatment in the new port in the U.S, need to rapidly install a shipboard ballast water treatment system, or likely will be unable to discharge their untreated ballast water in compliance with this permit's applicable requirements.

4.4.3.5.3 Use of Public Water Supply Water

EPA has addressed in the permit the use of water from US or Canadian public water supplies as a ballast water treatment method for vessels required to complete ballast water treatment. For the 2009 US Coast Guard proposed ballast water discharge standard rulemaking, twenty commenters[19] urged the Coast Guard to exempt vessels from having to treat their ballast water if the water was obtained from a municipal water supply. The commenters stated that this is a common practice for inland towing vessels and/or barges and offshore energy services. Based in part on these comments (available in the docket for today's permit) and comments on the 2011 draft VGP, EPA believes that public water supply water is an option for certain vessels to use in their ballast water management approaches. Furthermore, EPA believes that water which satisfies the standards of the Safe Drinking Water Act (42 U.S.C. §§ 300f-300j) or Canada's "Guidance For Providing Safe Drinking Water in Areas of Federal Jurisdiction" should be acceptable for use as ballast water without posing a significant threat of introducing or spreading ANS. Drinking water treatment processes require a high degree of disinfection and in many cases, filtration, which would make the likelihood of loading ANS into a vessel's ballast tank highly unlikely. EPA notes that it has imposed several BMPs in the permit, pursuant to 40 CFR 122.44(k)(4), to ensure that the applicable effluent limits are achieved. In particular, the permit provides that a vessel owner/operator must certify that it exclusively uses public water supply water in order to utilize this management measure to meet the treatment requirements of this permit. Any mixture of water obtained from a source other than a facility meeting the requirements of the Safe Drinking Water Act will negate acceptability of potable water as discharged ballast water.

4.4.3.5.4 No Discharge of Ballast Water

A fourth option available to vessel owner/operators is to not discharge ballast water. For many vessel types and routes, this is a feasible option which is available, practicable and economically achievable.

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[19] See docket number USCG-2001-10486 for all comments submitted to the U.S. Coast Guard as part of their proposed rulemaking.

Ballast water is treated to mitigate the risk posed by potential ANS contained within the ballast water tank. If a vessel does not discharge any ballast water, the risk associated with such discharges is nil.

Examples of vessels which may not need to discharge any ballast water include some cruise ships, container ships, and utility vessels. These vessels often have numerous ballast tanks onboard with internal piping which connects those tanks. Hence, they can internally shift ballast water between tanks as needed to adjust the trim and stability of the vessel. Other vessels, such as some tugboats, use permanent ballast and never discharge that water (AWO, 2009). In the case of offshore supply vessels, these transport potable water to offshore facilities and do not need to discharge ballast water to receiving waters (see comments submitted in response to US Coast Guard rulemaking; e.g., USCG-2001-10486-0440 and USCG-2001-10486-0457). Finally, though generally in a concept stage, some large vessels, such as tankers, have been designed to be ballastless vessels (Mouawad, 2011; Parson and Kotinis, 2008); some of these designs do not substantially increase the exposed area of the hull (e.g., Mouawad, 2011) (which would increase hull fouling and might not actually reduce the transport of ANS). Though likely not appropriate for all vessel designs and operations, a ballastless design might result in the elimination of ballast water discharges from these vessels.

4.4.3.5.5 Schedule for when Ballast Water Treatment Becomes BAT (and Therefore Required)

In today's permit, EPA has determined that when technology capable of meeting the numeric concentration-based effluent limits in Part 2.2.3.5 becomes available and economically achievable (i.e., when it becomes BAT) is a function of a vessel's construction date, size, and class. Thus, those numeric effluent limits will become applicable as a vessel's technology-based effluent limits according to the schedule specified in the permit. This schedule is based on a determination by EPA that ballast water treatment technology to meet the numeric limits is or will be available and economically achievable for a vessel by the specified date. Pending installation of ballast water treatment or other methods to meet the numeric effluent limits, ballast water discharges must comply with the other BAT requirements (i.e., non-numeric BMPs) outlined in today's permit.

a. New Vessels

At the time the draft VGP was made available for comment in December 2011 (76 FR 76716), the USCG had proposed, but not finalized, its ballast water discharge standard and type-approval rulemaking (74 FR 44632, August 28, 2009). The draft VGP schedule for achieving compliance with its technology-based numeric limits for ballast water was consistent with the USCG proposal. As discussed in more detail in the Fact Sheet for the draft VGP, available information and analyses indicated that at least five different types of treatment technologies had been shown to be safe, reliable and effective at reducing viable living organisms in ballast water discharges so as to meet the limits in the IMO's BWM Convention Regulation D-2 and the USCG's proposed phase 1 standard. Furthermore, the available information demonstrated that such technologies were commercially available for shipboard installation and their use was economically achievable if they were installed on an appropriate implementation schedule. In light of that, based upon a BPT/BCT/BAT determination as discussed in section 4.4.3.5.1 of the draft 2011 VGP Fact Sheet, EPA proposed to establish numeric ballast water discharge limits consistent with the USCG Phase I proposed discharge standard/IMO standard, with a rolling implementation schedule similar to that contained in the USCG proposal and IMO BWM Convention. As explained in this Fact Sheet, and in the response to comments document, EPA continues to believe that the draft VGP's technology-based ballast water numeric limits are appropriate for inclusion in the final VGP.

Since publication of the draft VGP, the USCG has finalized its ballast water discharge standard and type-approval rulemaking (77 FR 77 17254, March 23, 2012). That final rule, like today's permit, retains the USCG's proposed phase 1/IMO BWM Convention Regulation D-2 numeric limits. However, due to concerns that there would not be an adequate number of approved BWMS , the final rule delayed the date for which a vessel would be considered a new build vessel by 23 months -- from January 1, 2012, to December 1, 2013 (77 FR 17259; 17266; 17271). Under both the USCG and EPA requirements, "new build" vessels must comply with the ballast water discharge standards immediately upon entering into service.

The USCG does not anticipate completing its type approval of any system prior to 2015 (77 FR 17259). In light of that, the USCG March 2012 final rule contains a process ("Alternate Management System" or "AMS") under which, subject to approval by the USCG, a foreign type-approved treatment system may be temporarily used while operating in waters subject to the USCG rule. 33 CFR 151.2026; see 77 FR 17259. As a result, a vessel owner/operator may comply with USCG regulations by using an AMS system and would no longer need to conduct ballast water exchange if previously required to do so. However, even with the AMS process, the USCG anticipates there will not be an adequate number of USCG-approved BWMS to allow vessel owners to meet the compliance date for new vessels as was proposed in their rulemaking (and which was also included in the 2011 draft VGP) (77 FR 17259).

The USCG's final rule's schedule for compliance for existing vessels remained unchanged from their proposal, and, consistent with the December 2011 draft VGP, today's final VGP also leaves the schedule for existing vessels unchanged. However, with respect to new vessels, EPA believes that it is appropriate to revise the VGP schedule for meeting the technology-based ballast water numeric limitations in a manner consistent with the USCG final rule. Based upon comments received on the proposed VGP, and consistent with the changes made in the final USCG rulemaking with respect to new build vessels' compliance dates, EPA has defined "new build" vessels as those constructed (as defined in Appendix A of the VGP) after December 1, 2013 and, like the Coast Guard, has required compliance with the technology-based ballast water numeric limitations upon delivery.

The USCG is responsible for administering and implementing the BWMS type-approval and AMS approval programs and has concluded that for new vessels, such an extension of the schedule is necessary in light of the time it will take to implement its type-approval and AMS process. EPA believes that it is not advisable to in effect require installation of treatment systems that have not undergone required review and quality control under the USCG regulations. The potential consequences of installation of systems which do not function as designed would be less effective treatment than provided by ballast water exchange alone and additional economic costs for vessel operators required to reinstall systems on a short schedule (i.e., if installed systems ultimately proved non-compliant with EPA standards or failed to obtain USCG approval in the required timeframes). As explained further in the economic analysis for today's final VGP, requiring installation of systems before either AMS or type approval has been granted, thereby increasing the potential that treatment systems unable to meet the technology based numeric limits in today's final VGP would have to be torn out and replaced, would raise additional issues of the economic achievability regarding the immediate installation of ballast water treatment systems for vessels built between Jan.1 2012 and Dec. 1 2013. In light of the above, we have revised the Final 2013 VGP schedule to reflect the schedule now contained in the USCG final rule.

b. Existing Vessels

As described more fully above, ballast water treatment technologies have been developed that have been demonstrated to meet the IMO D-2 standard within the context of typical marine vessel constraints, including restrictions on size, weight, and energy demands. While practicable for newly constructed vessels, integrating such technologies on a retrofit basis may be challenging for some vessels (US EPA SAB, 2011). Hence, based upon additional challenges associated with retrofitting the large number of vessels that will need to install treatment technologies to meet the numeric ballast water effluent limits in the permit (see Bacher, 2011; Hintzsche, 2011), EPA has included a rolling implementation schedule that requires the installation of BWTS by the first drydocking after 2014 or 2016 (dependent upon vessel size), which may extend beyond the permit term for certain vessels. This time schedule is consistent with the timelines in the IMO treaty and the Coast Guard's March 2012 rulemaking.

EPA's adoption of this schedule reflects the fact that the BW treatment system industry will need the additional time provided by the schedule to produce the required units, and vessel owners will need that additional time to do the advance work necessary to ensure that they choose and secure the appropriate system for their vessels and, to make arrangements for drydocking or other time out of service and inspection and approval necessary to properly install the technology. Until all of this is accomplished, treatment technology meeting the standards set out in section 2.2.3.5 of this permit will not be "available" within the meeting of the Clean Water Act. Because it is well-known that the IMO standards will imminently come into effect (and USCG ballast water rulemaking has been finalized), manufacturers and vessel owners have been engaging in the multi-year planning necessary to implement the IMO standards on the IMO schedule. Thus, the industry as a whole should be on track to have treatment technologies installed on that schedule. Although EPA did consider accelerating this, the Agency decided against doing so, since, as noted above, the BW treatment system industry needs the additional time reflected in the VGP's schedule to produce the required units. In addition, the Agency is concerned that altering the anticipated schedule at this late a date would disrupt the industry's prior planning and that efforts to establish additional production capacity could distract manufacturers' resources from meeting existing demand, and thus perhaps even result in further delays. Given the magnitude of the task for manufacturing and installing ballast water treatment systems, EPA believes that the timeframes for when treatment technology becomes "available" to meet the limits found in Part 2.2.3.5 of the VGP is reasonable. Further discussion of the factors that informed EPA's adoption of the IMO timeline follows:

Manufacturing capacity: The ballast water treatment system industry is relatively young and currently has a limited production capacity. As of February, 2010, Lloyds Register (2010) estimated that there were 119 ballast water treatment systems installed worldwide. As of June 2011, Lloyds Register (2011) estimated that a total of 200 systems have been installed on vessels worldwide. The government of Japan estimates that more than 70,000 vessels worldwide will need to be fitted with ballast water treatment systems (MEPC 61/2/17); see Figure 1 below. King (2010) notes that even on the IMO schedule, 20,000 to 30,000 systems may need to be installed on vessels per year. If EPA were to require all systems be installed within a 1-2 year period, even only on vessels operating in US waters, it would be highly unlikely that vendors could meet production demand for the large number of vessels operating in US waters during that time. Furthermore, by spreading the production of systems over several years, vendors will have the opportunity to perfect and improve systems, such that any defects or shortcomings observed in the first systems produced and installed can be corrected.

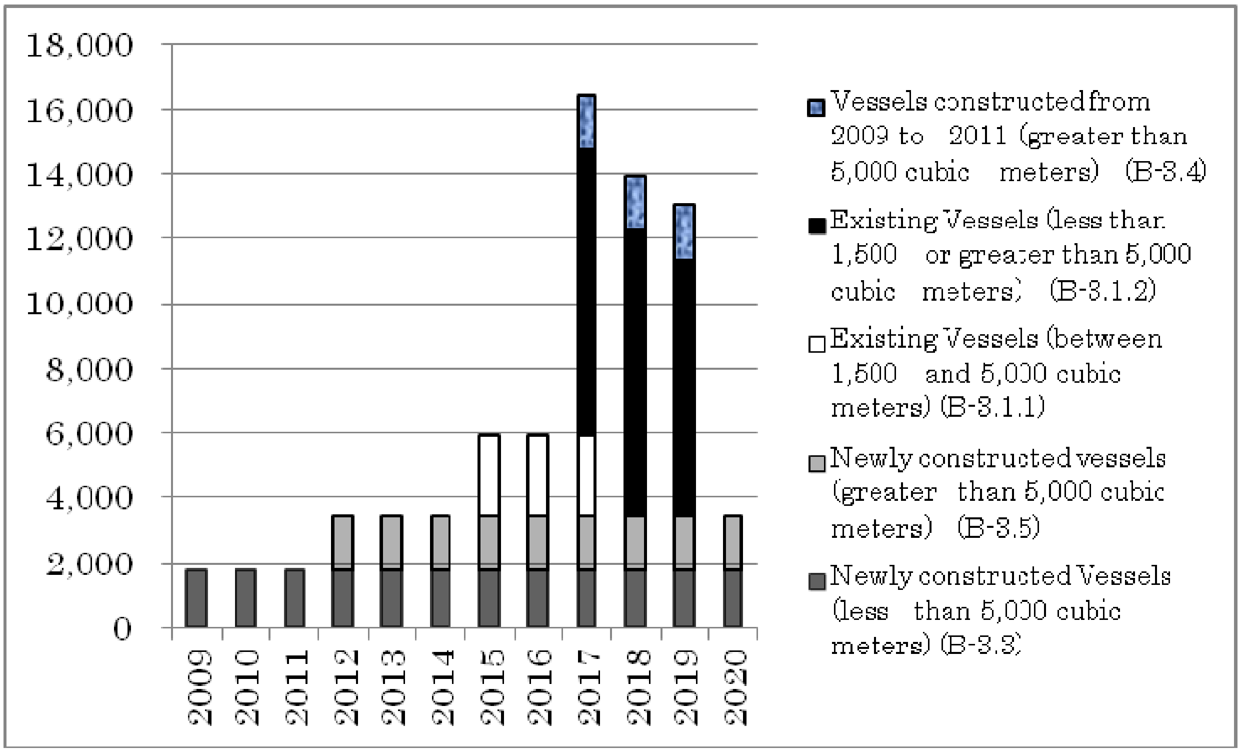

Figure 1. Installation Schedule of Ballast Water Treatment Systems Estimated by the Government of Japan (MEPC 61/2/17).

Drydock availability and time out of service: It is not feasible to expect all existing vessels which operate within U.S. waters to install ballast water treatment systems within a short period of time (e.g., one or two years). EPA expects that many existing vessels will need to enter drydock or make arrangements for time out of service to install a ballast water treatment system and have that installation inspected and approved by their class society and/or flag administration. It is EPA's understanding that vessels drydock on a three to five year cycle and vessels typically arrange for drydocking many months to years in advance. Drydocking must take place no less than once every five years (US EPA SAB, 2011 citing ABS SVR 7/2/1-11), meaning that vessel owner/operators cannot put off installation of ballast water treatment systems indefinitely. Furthermore, worldwide drydocking capacity is limited, and all vessels would not be able to enter drydock within the same year.

Retrofitting: Installation of ballast water treatment systems on existing vessels is more complicated than installation on new-build vessels (ABS, 2010; GLBWC, 2010). Whereas owner/operators of new build vessels have known about ballast water treatment systems and potential requirements, and so could design vessels for their ultimate inclusion, previously constructed vessels are likely to have additional design challenges (Bacher, 2011; Hintzsche, 2011). For instance, many vessels have space or energy limitations, which reduce a vessel's options for which systems they select (Albert and Everett, 2010). Additionally, many vessels will have to install additional ballast system access points and sampling ports; all of which must be designed before installation. Hence, for existing vessels, installation of a ballast water treatment system is not a turn-key operation, and owners will need some time to identify, procure and install the appropriate system for their vessel and its operating circumstances.

Economic Impacts: Please see the discussion above under "Ballast water treatment requirements in the 2013 VGP are economically practicable and economically achievable" for a discussion of what a more rapid implementation schedule might mean economically.

EPA believes that a less rapid implementation schedule than that in today's permit is also not reflective of BAT. Vessel owner/operators have had many years to prepare for the installation of ballast water treatment systems, and as discussed earlier in this fact sheet, numerous ballast water treatment systems are available today. Installation deadlines (e.g., when installation of a treatment system becomes BAT) for existing vessels begin more than 1 year after the anticipated finalization of the next VGP and treatment system requirements phase in over a multi- year period. Additionally, the U.S. Coast Guard finalized the ballast water discharge standard rulemaking with the same schedule for existing vessels as contained in today's permit. If vessel owner/operators anticipate complications with installing ballast water treatment systems during the 2016 to 2019 time period due to high demand and treatment system manufacturer backlog, EPA strongly advises these owner/operators to begin planning and, as appropriate, taking concrete steps, to avoid these complications today. This may include installing ballast water treatment systems before a drydocking before January 1, 2016 in those cases where vessel owner/operators can plan, design, and procure a ballast water treatment system for one or more of their vessels in this shortened time period.

EPA also notes that the CWA requires that BAT be required no later than July 1, 1989 or for entities permitted for the first time after that date, BAT must be achieved immediately upon permit effectiveness. CWA section 301(b)(2). When EPA issued the first VGP in 2008, it established BAT for all vessels, and thus satisfied the statutory timeframe obligation. In this next iteration of the permit, EPA is ratcheting down to a more stringent BAT numeric effluent limitation for certain vessels over time, based upon when technological advancements will make these more stringent limits available and practicable and economically achievable. For certain dischargers, EPA has determined that the technology will be available, practicable and economically achievable at time of permit issuance, and therefore the numeric limit constitutes BAT at that time. For other dischargers, EPA has determined that the technology will be available, practicable and economically achievable over time, and therefore the numeric limits constitute BAT on the dates specified in the implementation schedule.

4.4.3.5.6 Vessels Not Required to Meet Part 2.2.3.5 Treatment Standards

The numeric concentration-based treatment limits do not apply to all vessels subject to this permit. Separate technology-based effluent limitations, in the form of BMPs under 40 CFR 122.44(k)(3) (e.g., Part 2.2.3.3 and 2.2.3.4 of the permit), apply to the vessel classes discussed below:

4.4.3.5.6.1 Vessels Engaged in Short-Distance Voyages

The following vessels, regardless of size, build date and type are not required to meet the ballast water discharge standards found in Part 2.2.3.5 of this permit:

- Vessels which stay within a single US Coast Guard Captain of the Port (COTP) zone; and
- Vessels which do not travel more than 10 nm and cross no physical barriers or obstructions (e.g., locks), whether or not they operate within one US Coast Guard COTP zone.

EPA has not mandated that vessels meet the numeric ballast water effluent limits in Part 2.2.3.5 for these vessels operating on generally short routes to minimize other non water-quality environmental impacts. 40 CFR § 125.3(d)(3). Such limits are based on the application of certain technologies, and as discussed below, use of ballast water treatment systems results in some non- water quality environmental impacts, including increased energy usage and increased carbon emissions. Vessels which operate on short routes may discharge ballast water more frequently than vessels on longer routes, and as such, would have higher non-water quality impacts (e.g., higher energy usage, increased greenhouse gas emissions) per distance travelled.

Furthermore, many existing ballast water treatment systems use biocides (see Albert et al., 2010 for a list of ballast water treatment systems using biocides as of June 2010; Lloyd's 2011 estimates approximately half of all ballast water treatment systems installed to date use a biocide). These biocides often need minimum contact time to be effective – short distance voyages might not provide this necessary time. Additionally, the discharge of ballast water treated with biocides may contain residuals or byproducts from that treatment, and short voyage times may not permit adequate decay or neutralization.

EPA has included a definition which makes use of US Coast Guard COTP zones and distance travelled. For the first definition of a short voyage, EPA chose the US Coast Guard COTP zone as the boundary within which vessels might voyage without having to meet the limits found in Part 2.2.3.5 of the VGP, as this is a well known administrative district for vessel owner/operators. For example, the US Coast Guard (and the US EPA in the 2008 VGP) does not require ballast water exchange if vessels stay within the COTP zone.

The second definition of a short voyage under the VGP is for vessels such as cross river ferries that might cross a US Coast Guard COTP boundary. Though EPA is not aware of any specific vessels which currently meet these criteria, EPA did not want to inadvertently require ballast water treatment systems for vessels that would result in result in other environmental impacts (e.g., more biocides added to the aquatic environment, more fuel consumed and greenhouse gasses released). If a vessel crosses a US Coast Guard COTP boundary, however, EPA limited the maximum distance which could be voyaged to no more than 10 miles to be considered a short voyage. Additionally, to be considered a short voyage, the vessel cannot cross a physical boundary (e.g., lock, falls). EPA included this upper bound to limit the dispersal of ANS across Coast Guard COTP boundaries (e.g., from one estuary to a nearby coastal estuary) or across potential obstructions to the dispersal of invasive species.

Finally, EPA notes that vessels which travel short distances and do not cross physical barriers are less likely to pose risk in widely dispersing living organisms.

4.4.3.5.6.2 Unmanned, Unpowered Barges

Unmanned, unpowered barges generally move in the inland and coastal waterway system to transport low-value bulk items such as grain, coal, or iron ore. These vessels are roughly equivalent to a maritime railway car and are not manned with crew and do not have infrastructure that allows for complex or energy intensive operations. EPA understands that ballasting for barges is typically done in limited locations to pass under bridges and that the ballast intake and discharge occur immediately before and after transit under the bridge. In other cases, these barges ballast to improve stability in stormy conditions or other rough water. The vessels typically do not have dedicated ballast water tanks but can use wing tanks (void space) in the hull when ballasting is necessary. Minimal water is used for ballasting and EPA does not believe that barges are a significant discharger of ballast water.

Unmanned, unpowered barges have been recognized as posing unique challenges for managing ballast water. For instance, EPA's SAB board notes:

> Inland waterways and coastal barges are not self-propelled, but rather are moved by towing or pushing with tugboats. Because these vessels have been designed to transport bulk cargo, or as working platforms, they commonly use ballast tanks or fill cargo spaces with water for trim and stability, or to prevent excessive motions in heavy seas. However, the application of [Ballast water management systems] on these vessels presents significant logistical challenges because they typically do not have their own source of power or ballast pumps and are unmanned (US EPA SAB, 2011, 40).

Due to the complexities of operating existing type approved ballast water treatment systems, EPA has determined that treatment technologies are not currently available for unmanned, unpowered barges which meet the IMO discharge limit. As a result, EPA has not included numeric treatment limits for unmanned, unpowered barges.

4.4.3.5.6.3 Vessels That Operate Exclusively on the Laurentian Great Lakes (Commonly Known as Lakers) Built Before January 1, 2009

Vessels that operate exclusively on the Laurentian Great Lakes are not subject to the numeric limits found in Part 2.2.3.5 of the VGP. The Laurentian Great Lakes means "upstream of the waters of the St. Lawrence River west of a rhumb line drawn from Cap de Rosiers to West Point, Anticosti Island, and west of a line along 63 W. longitude from Anticosti Island to the north shore of the St. Lawrence River and includes all other bodies of water within the drainage basin of such lakes and connecting channels).), As discussed by EPA's SAB, existing Lakers face unique operational and design constraints:

> In addition to specific environmental and vessel applications, vessel type and vessel operations can dictate [Ballast Water Management System] applicability. Although a multitude of vessel designs and operation scenarios exist, a few important examples of specific constraints can greatly limit treatment options. Perhaps the most dramatic limitations are found with the Great Lakes bulk carrier fleet that operates vessels solely within the Great Lakes with large volumes of fresh, and often cold, ballast water ("Lakers"). The vessels in this fleet have ballast volumes up to 50,000 m3, high pumping rates (up to 5,000 m3/hour), uncoated ballast tanks (older vessels), and some vessels have separate sea chests and pumps for each ballast tank. A further confounding issue is that voyages taken by Lakers average four to five days, with many less than two days. Given these characteristics, a number of limitations are imposed. . . US EPA SAB 2011, 40.

Due to the challenges of installing ballast water treatment systems currently available on the many vessels in the Laker fleet, the cost of installing those systems at this time due to Lakers' unique designs, and the lack of currently available ballast water treatment systems appropriate for the largest Lakers, alternative technologies are being researched. For example, ongoing research by the Great Ships Initiative (GSI), American Steamship Company (ASC), the National Park Service (Isle Royale National Park) and the United States Geological Survey (USGS) is being conducted to test the efficiency of various biocide introduction scenarios into a ship's ballast tanks. Bench-scale and land-based tests of various biocides and neutralizing agents have been conducted by GSI (Cangelosi, 2011), and in August 2011, GSI conducted the first ship board test of a sodium hydroxide biocide with carbon dioxide neutralizing agent onboard the ASC's vessel M/V Indiana Harbor, a large Laker confined upstream of the Welland Canal. This technology is in the experimental testing stage, and thus there are many unresolved issues, including: the efficacy of this or other biocides; whether the active substance used to kill the organisms in the ballast water can be sufficiently neutralized prior to or during discharge so as to not cause toxic effects to the aquatic life of the surrounding water; whether there are other parameters of concern (such as dissolved solids, chlorides, sodium, salts, acidity, etc.) in such a discharge that may have deleterious environmental effects; as well as potential for such systems and chemicals to pose harm to the ship's crew or the ship itself. Nonetheless, if these issues can be appropriately addressed, such as if an active substance and disinfection regime can be identified, such technology might be a potentially useful treatment technology for some Lakers in the future. Additionally, EPA notes that there are questions about whether there is an adequate supply of ballast water treatment systems designed to operate exclusively in cold, freshwater environments, and that the availability of ballast water treatment systems built to operate under these scenarios may lag the development of ballast water treatment systems designed for ocean-going and coastal vessels. Hence, EPA will closely follow the state of technologies currently being tested for all Lakers, including the largest Lakers confined upstream of the Welland Canal. EPA will consider revising permit requirements during the term of the permit if such technologies do become available.

In Today's permit provides that existing vessels operating exclusively on the Laurentian Great Lakes are not be subject to the requirement to meet the effluent (and related) limits in section 2.2.3.5 during the term of this permit. However, EPA is including a permit reopener condition that addresses EPA's ability to modify the permit to require installation of ballast water treatment systems if such systems become available. EPA advises Laker owner/operators that EPA intends to promptly exercise the permit reopener to initiate the process to modify the permit if such systems become available during the permit term. These requirements may include requiring that effluent meet levels achievable by treatment with an IMO type approved device or requiring an alternative technology-based ballast water effluent limit.

EPA further notes that this requirement is generally consistent with the recently finalized Coast Guard ballast water rulemaking. In that rulemaking, USCG states that: "For the reasons we have discussed in th[e] preamble, we are not requiring vessels that operate exclusively in the Great Lakes to comply with BWDS in this final rule" (77 FR 17260).

New Lakers

All Lakers built after January 1, 2009 must meet the ballast water treatment limits found in Part 2.2.3.5 of the permit. EPA selected January 1, 2009 as the cutoff date because this is the date that IMO originally first required treatment for some new build vessels. Any vessel owner/operators building or contracting vessels after this date were well aware of the need to design their systems to meet ballast water discharge limits and EPA therefore assumes that such vessels were so designed. EPA notes that the IMO schedule was extended for vessels with less than 5,000 cubic meters of ballast water, from January 1, 2009 to December 31, 2011 via Assembly Resolution A1005[25].[20] However, EPA notes that any owner/operator constructing vessels by the 2009 date were well aware of impending ballast water management requirements, and hence, should have appropriately designed their vessels to accommodate retrofitting a ballast water treatment system onboard.

Additionally, existing Lakers must meet all other ballast water requirements found in Part 2.2.3.3 of the VGP and Laker specific requirements found in Part 2.2.3.4 of the VGP. These supplemental requirements were developed to reduce the number of living organisms in ballast water, and the risk of their dispersal within the Great Lakes ecosystem.

4.4.3.5.6.4 Inland and Seagoing Vessels less than 1600 Gross Registered Tons (3000 Gross Tons)

Inland and Seagoing Vessels less than 1600 gross registered tons (3000 gross tons) are not required to meet the numeric treatment limits in Section 2.2.3.5 of today's permit. A seagoing vessel means "a vessel in commercial service that operates beyond the boundary line established by 46 CFR Part 7. It does not include a vessel that navigates exclusively on inland waters." (From 151.2005). An inland vessel means a vessel that operates exclusively on inland waters. EPA encourages vessels in this size class to use alternate measures to reduce the number of

[20] Assembly Resolution A1005[25] recommends that States henceforth ratifying, accepting, approving or acceding to the Convention should accompany their instrument of ratification, acceptance, approval or accession, as appropriate, with a declaration or otherwise communicate to the Secretary-General their intention to apply the Convention on the basis of the following understanding, also taking into account paragraph 3:
"A ship subject to regulation B-3.3 constructed in 2009 will not be required to comply with regulation D-2 until its second annual survey, but no later than 31 December 2011."

living organisms in their ballast water discharges, including use of those measures found in Part 2.2.3.5 of this permit and use of onboard potable water generators.

The draft VGP would have required any vessel (not otherwise exempt) that carries greater than 8 cubic meters of ballast water to meet the numeric ballast effluent limitations for ballast water. Several commenters, however, argued that technologies are currently not available and/or economically achievable for the smaller size of non ocean-going vessels (e.g., tugboats) that may carry more than 8 cubic meters of ballast water. In response to these comments, EPA took a closer look at the record for the proposal and reassessed whether it demonstrated that ballast water treatment technologically is available and economically achievable for smaller vessels.

Based upon that review, EPA concluded that ,though technologies are promising for future development, the record at proposal did not support the conclusion that numeric ballast water treatment limits for small inland and seagoing vessels represents BAT at this time or over the life of the permit. For example, most ballast water treatment systems have been designed for larger vessels and/or vessels which only uptake or discharge ballast water on either end of longer voyages and the record at proposal contained no evidence that any vessels smaller than 1600 GRT had successfully installed a treatment systems on their vessel. Supplemental analysis by the Agency confirmed the conclusion that the ballast water numeric limits did not reflect BAT for this class of vessels.[21] EPA further notes that though meeting numeric limits does not represent BAT for these small inland and coastal vessels as a class, ballast water management measures to minimize the discharge of untreated ballast water might be available for some individual vessels in this class of vessels. For example, some smaller vessels because of their unique designs and operations might be able to use potable water for ballasting. For these reasons, EPA reemphasized the requirement for these vessels to meet existing ballast water minimization management measures in Part 2.2.3.3 of the permit and the agency strongly encourages all vessel owner/operators in this size class to take whatever measures they are able to reduce or eliminate the discharge of untreated ballast water into waters subject to this permit.

Other than for the vessel types and voyage patterns discussed above, EPA found no basis for differentiating BPT/BAT solely based on age of equipment and facilities, process, process changes, or other engineering factors.

4.4.3.5.7 Data Sources used in generating today's numeric ballast water limits

In developing today's numeric effluent limits, EPA considered data from numerous peer reviewed publications, literature produced by the federal government, other technical reports and publications, public comments, and comments from experts working in the field (see US EPA SAB, 2011; Albert et al., 2010; CSLC, 2010; GLBWC, 2010; Lloyd's List, 2010; WDNR, 2010). The data sources from which EPA derived information for decision-making purposes are included in the docket for the permit and/or referenced in this fact sheet (any material referenced in the fact sheet but not included in the docket is generally available published material). These

[21] Commenters addressed this issue in terms of "small" vessels generally or with respect to certain small vessel types, such as tugboats, without suggesting a specific threshold for applicability. EPA's evaluation of the data led the Agency to conclude that the 1600 gross registered ton threshold for applicability of the US Coast Guard ballast water rule to inland and seagoing vessels (see 17304, Mar. 23, 2012) accurately reflected the class of vessels for which proven technologies are not yet available or economically achievable.

data sources discuss ballast water discharges, technologies available for the treatment of these discharges, and the effectiveness of the technologies. EPA considered these data and how to design a permit that included the best practicable technology and best available technology economically achievable in formulating the permit.

As an important source used by EPA in setting the technology-based ballast water limits for today's VGP, EPA's SAB (2011) found that systems which meet the IMO D-2 standard are available. The EPA SAB also stated: Regarding the discharge standard 10x more stringent than the IMO D-2/ Phase 1, the criterion used was whether the number of living organisms in all size classes was consistently low following testing (below the detection limit, often reported as zero, or not more than twice the standard). However, as described in the response to charge question 4 (section 6), current testing methods do not provide the resolution required to conclude that 10x standards can be met" (EPA SAB, 2011, p. 32). The SAB further noted that systems "may have the potential to meet [a standard 10 times IMO] with reasonable/feasible modifications to the existing BWMS."

EPA has finalized the numeric concentration based limit contained in the 2013 VGP based on these analyses and had concluded that these limits are reflective of BAT.

4.4.3.6 Interim Requirements for Vessels Not Required to Meet the Ballast Water Management Measures in Part 2.2.3.5 of the VGP

EPA has found the following interim management measures for vessels not meeting the requirements of Part 2.2.3.5 of the VGP to be available, practicable and economically achievable. You must meet the interim management requirements as applicable until you meet the numeric treatment limits in Part 2.2.3.5 of the VGP.

4.4.3.6.1 <u>Requirements for Oceangoing Voyages While Carrying Ballast Water</u>

In the United States, the U.S. Coast Guard has requirements for the management of ballast water listed in 33 CFR Part 151, Subparts C and D. These regulations generally require that prior to vessels being mandated to comply with the numeric ballast water effluent limits in Part 2.2.3.5 of the permit, if they transit to U.S. waters with ballast water that was taken on within 200 nautical miles of any shore into waters of the United States after operating beyond the U.S. EEZ, they must conduct one of the following ballast water management practices:

- Conduct mid-ocean ballast water exchange further than 200 nm from any shore prior to entering U.S. waters or use an AMS;
- Retain the ballast water on board while in U.S. waters;
- Install and operate a USCG type-approved ballast water treatment system; or
- Use only water from a U.S. public water system. 33 CFR 151.1510(a) and 151.2025(a).

The regulations also contain exceptions to these requirements in extraordinary circumstances such as where there are safety concerns and do not require vessels will not be required to deviate from, or delay, their voyage in order to conduct exchange. 33 CFR 151.1515 and 151.2040.

The 2013 VGP incorporates these requirements and allows for most vessels which meet the treatment requirements found in Part 2.2.3.5 of the VGP to not also conduct ballast water exchange (except for certain vessels entering the Great Lakes as discussed in Part 4.4.3.9 of this fact sheet). Please see the BAT/BPT discussion in Parts 4.1 and 4.2 of this fact sheet for additional discussion regarding the basis for these requirements.

4.4.3.6.2 <u>Vessels Carrying Ballast Water Engaged in Pacific Nearshore Voyages</u>

As in the 2008 VGP, EPA has required ballast water exchange as an interim requirement for vessels engaged in Pacific Nearshore voyages. Vessels engaged in Pacific nearshore voyages include:

- Vessels engaged in the Pacific Coastwise trade that cross more than one Captain of the Port Zone and that will discharge ballast water into waters subject to this permit.
- All other vessels that sail from foreign, Atlantic, or Gulf of Mexico ports, which do not sail further than 200 nm from any shore, and that discharge or will discharge ballast water into the territorial sea or inland waters of Alaska or of the west coast of the continental United States.

Numerous studies and reports by NOAA and others have shown that mid-ocean ballast water exchange significantly reduces the presence of living organisms adapted to surviving in coastal, estuarine, and freshwater environments (Gray et al., 2007; Locke et al., 1993; McCollin et al., 2007; Ruiz & Reid, 2007). In a NOAA technical memorandum authored by Ruiz and Reid (2007), the authors made seven recommendations, one of which is that "B[allast] W[ater] E[xchange] should be considered a useful and beneficial ballast management practice to reduce species transfers and invasion risk. It is a valuable measure, especially because it is available now for immediate use on many vessels and shipping routes, in the absence of proven alternative treatment methods." Hence, ballast water exchange is an appropriate interim step toward mitigating the risk from the spread of ANS until effective treatment technology is available. There has also been considerable discussion about establishing alternate ballast water exchange areas (ABWEA) within areas closer to the coast. Participants in a 2006 workshop (Phillips, 2006) on establishing alternate exchange zones on the Pacific coast made three recommendations, two of which are applicable for the permit:

- In general, ABWEAs should be established no closer than 50 nm from shore and in waters at least 1000 m in depth.
- Establishment of ABWEAs should avoid major estuary and oceanic river plumes, subsurface physical features (e.g. seamounts), and known fishery habitats.

For the most part, the continental shelf along the Pacific coast is narrow along both North and South America. Deep water environments beyond the continental shelf typically support ecosystems that are quite different than those which exist closer to shore. Due in part to this short width of the continental shelf, relatively deep waters beyond 50 nm from the Pacific shore, and existing and pending regulation and statutes in California, Oregon, and Washington that require ballast water exchange for vessels engaged in the coastwise trade, EPA is requiring ballast water exchange under the permit for vessels engaged in Pacific nearshore voyages that will discharge ballast water into waters subject to this permit. If these vessels travel more than 50 miles from shore, they must conduct ballast water exchange while:

- In the Pacific Ocean,
- As early as practicable in the voyage,
- More than 50 nm from shore, and
- Preferably where the vessel is not near major estuary and oceanic river plumes, subsurface physical features (e.g. seamounts), and known fishery habitats.

Based on reasons discussed above and elsewhere and this factsheet (e.g., see sections 4.1 and 4.2), EPA determined these requirements are technologically practicable and achievable, can be widely implemented, and will reduce the discharge of constituents of concern in ballast water streams. Furthermore, with implementation of existing and pending state regulation requiring similar practices, the incremental economic costs are relatively low (see the economic analysis prepared for this permit). However, EPA does not believe that vessels engaged in voyages that take them further than 200 nm from any shore should be allowed to exchange ballast water between 50 and 200 nm from the Pacific shore for the following reasons:

- This provision would not be consistent with existing U.S. Coast Guard regulations.
- Ballast water exchange 200 nm or more from shore generally is more likely to mitigate the risk for the spread of ANS than ballast water exchange closer to shore.

4.4.3.6.3 Mandatory Saltwater Flushing

Mandatory saltwater flushing is required by this permit for all vessels carrying unpumpable ballast water and residual sediment that operate outside the US EEZ which are not required to meet the treatment requirements found in Part 2.2.3.5 of the VGP, travel more than 200 nm from shore, and will subsequently discharge ballast water to waters subject to this permit and for vessels that engage in Pacific nearshore voyages that will discharge ballast water in waters subject to this permit. This requirement is the same as to that found in the 2008 VGP. The permit states that "saltwater flushing means the addition of mid-ocean water to ballast water tanks containing only unpumpable residual ballast water; the mixing of the added water with residual ballast water and sediment through the motion of the vessel; and the discharge of the mixed water until loss of suction, such that the resulting residual water remaining in the tank has either a salinity greater than or equal to 30 parts per thousand (ppt) or a salinity concentration equal to the ambient salinity of the location where the uptake of the added water took place" (see Parts 2.2.3.7 and Part 7 of the permit). This process of flushing out empty ballast water tanks with mid-ocean saltwater is also commonly referred to as "swish and spit". The vessels subject to this requirement are either those which have any ballast water tank that is empty or contains unpumpable residual water or those that certify, consistent with the Coast Guard's regulations, that they have "No Ballast on Board" ("NOBOB" vessels). As previously noted, the Coast Guard currently has a voluntary saltwater flushing policy in place for all vessels entering the Great

Lakes, and defines NOBOB vessels as "those vessels that have discharged ballast water in order to carry cargo, and as a result, have only unpumpable residual water and sediment remaining in tanks." 70 FR 51832 (August 31, 2005). The purpose of mandatory saltwater flushing is to prevent the spread of ANS in ballast water tanks that appear empty, but often have unpumpable ballast water and/or residual sediment at the bottom of the tanks that may contain organisms which can become ANS.

Saltwater flushing has been shown to be effective in preventing the introduction of ANS from vessels with residual ballast water and sediment in their ballast water tanks. In a NOAA technical memorandum, another of Ruiz and Reid's (2007) concluding recommendations is that "[t]he use of high-salinity water to flush NOBOB ballast tanks should be considered a useful and beneficial management practice to reduce species transfers and invasion risks associated with NOBOB ships entering the Great Lakes. In the absence of proven alternatives, this practice provides some level of protection against some adult and larval life stages." Additionally, saltwater flushing reduces the concentrations of sediment, a conventional pollutant, in ballast water discharge and, therefore, generally improves the quality of the ballast water discharge.

Transport Canada has mandatory saltwater flushing requirements in its regulations for all vessels that discharge ballast water in Canadian Great Lakes ports. Furthermore, the Saint Lawrence Seaway Development Corporation (SLSDC) recently published a final rule amending joint regulations at 33 CFR Part 401.30. The amendment is an effort to harmonize the ballast water requirements for vessels transiting the U.S. waters of the Saint Lawrence Seaway System with the saltwater flushing requirements already in place for vessels entering the Canadian waters of the Seaway System. The amendment, which went into effect on March 26, 2008, requires vessels that operate outside the EEZ to conduct saltwater flushing of ballast water tanks containing residual amounts of ballast water and sediment at least 200 nautical miles from any shore. The saltwater flushing must occur prior to entering either the U.S. or Canadian waters of the Seaway System. <u>See</u> 33 CFR 401.30(f); 73 FR 9950 (February 25, 2008). Hence, all vessels entering the Great Lakes must already use saltwater flushing for their tanks with unpumpable ballast water and residual sediment, and this permit reinforces these requirements.

As with the 2008 VGP, today's permit extends saltwater flushing requirements for vessels that travel more than 200 nm from shore and vessels engaged in Pacific nearshore voyages because EPA believes saltwater flushing is a widely-used low-cost approach that minimizes the risk that ANS will be successfully introduced from unpumpable ballast water and residual sediment. Saltwater flushing is most effective at eliminating organisms adapted to freshwater and low salinity environments due to the combined impacts of saltwater shock and physical dilution. However, saltwater flushing should also reduce viable living organisms adapted to estuarine, coastal and marine environments. First, saltwater flushing may reduce viable living organisms in residual ballast water through dilution. Secondly, saltwater flushing reduces the number of viable living organisms and organisms in resting stages in the residual sediment. Resting stages of ANS often inhabit the sediment in ballast water tanks: reducing the numbers of these organisms with both physical flushing and saltwater shock when applicable will likely reduce the propagule pressure of these potential invaders. Hence, the requirements for mandatory saltwater flushing are available, practicable and economically achievable. Additionally, the permit applies saltwater flushing on a tank-by-tank basis, and does not just limit this practice to vessels that declare they carry only unpumpable residual ballast water. This is because the empty ballast water tanks in vessels that have a mixture of empty tanks and tanks containing pumpable ballast water still pose a risk of introducing ANS when the empty tanks are subsequently filled and discharged, and saltwater flushing of those tanks will help reduce this potential. However, vessels that seal empty tanks and will not use them to discharge ballast water in waters subject to this permit do not need to conduct saltwater flushing.

4.4.3.6.4 Vessels that Complete Ballast Water Exchange Must Do So as Early as Practicable

As in the 2008 VGP, EPA has included a requirement for vessels to exchange ballast water as early as practicable. For those vessels that carry ballast water that was taken on in areas less than 200 nautical miles from any shore and will discharge into the waters subject to this permit after operating beyond the EEZ, EPA has included a requirement that all vessels that conduct ballast water exchange must do so as early as practicable, so long as the exchange occurs more than 200 nm from shore. This requirement will directly contribute to increased mortality of remaining living organisms in ballast water tanks. Increased mortality will result in the discharge of fewer viable living organisms, which will consequently reduce the likelihood of the risk of the establishment of ANS.

4.4.3.6.5 Requirements for Tankers Engaged in the Coastwise Trade

Section 1101(c)(2)(L) of the National Invasive Species Act of 1996 (16 U.S.C. 4711) generally exempts crude oil tankers engaged in the coastwise trade from ballast water management requirements. There is no counterpart exemption for such vessels in the CWA, nor does it appear that such vessels are inherently unable to perform the ballast water exchange and other ANS management practices that their non-exempt vessel counterparts can and do routinely carry out. Additionally, EPA expects these vessels to be able to meet the treatment requirements in Part 2.2.3.5 of the VGP. Hence, as in the 2008 VGP, the NPDES permit would not exempt crude oil tankers in the Coastwise trade from its ballast water management requirements, and such tankers must either seek coverage under the permit and comply with its applicable terms or seek alternative NPDES permit coverage as discussed under the alternative permits section in Part 1.8 of the permit.

4.4.3.7 Vessels Entering the Great Lakes

EPA has included additional permit conditions requiring all vessels that are equipped to carry ballast water and that enter the Great Lakes to comply with Coast Guard regulations mandating ballast water exchange (33 CFR Part 151, Subpart C). Also, vessels that operate outside the EEZ and more than 200 nm from any shore, and then enter the Great Lakes via the Saint Lawrence Seaway System must comply with St. Lawrence Seaway Development Corporation regulations that mandate saltwater flushing of ballast tanks (33 CFR part 401.30). These requirements constitute technology-based effluent limits for ballast water discharges from these vessels; additional requirements on vessels entering the Great Lakes are imposed as water quality-based effluent limits in Part 2.2.3.7 of the permit: see section 4.4.3.9 of this fact sheet for additional discussion.

4.4.3.8 Vessels in the U.S. Coast Guard Shipboard Technology Evaluation Program (STEP)

A vessel equipped with ballast water tanks is not required to meet the requirements found in Parts 2.2.3.5 (except 2.2.3.5.1.1.5 and 2.2.3.5.1.1.6) and 2.2.3.6 of the VGP if the vessel is accepted by the U.S. Coast Guard into the Shipboard Technology Evaluation Program (STEP) as long as the vessel meets all of the requirements of such program. EPA believes that the STEP program has played, and will continue to play, a critical role in the development of effective ballast water treatment systems, as may other related or similar programs the Coast Guard might implement in the future. The program has encouraged pioneering vessel owner/operators to install ballast water treatment systems, has contributed to the development of effective sampling methods, and allowed for the collection of valuable shipboard ballast water treatment data needed to evaluate the efficacy of ballast water treatment systems. Furthermore, as systems are developed and refined, such programs will play a valuable role in supporting the development of technologies which exceed the performance of the IMO standard. EPA believes that STEP and other such programs will play a key role in the development of a greater range of systems which can meet the limits in today's permit, and will also allow a venue for treatment vendors to develop systems to meet more stringent standards such as the previously proposed U.S. Coast Guard phase II standard. Finally U.S. Coast Guard programs (such as or similar to STEP) provide a mechanism for vessels to use not-yet approved BWMS during the testing required for type approval.

EPA is requiring that vessel owner/operators of vessels enrolled in STEP must meet the requirements of Parts 2.2.3.5.1.1.5 and 2.2.3.5.1.1.6 of the permit. These requirements contain authorization, effluent limits, and basic monitoring for active substances from ballast water treatment systems. They also include recordkeeping and reporting requirements specific for vessels utilizing ballast water treatment systems (vessels enrolled in STEP are using ballast water treatment systems).

Vessel owner/operators enrolled in the STEP program must complete a rigorous application process and undergo extensive review. Additionally, vessels involved in STEP are utilizing ballast water treatment technologies which share similarities in capabilities (and in many cases are the same systems) as those described in section 4.4.3.5.1 of this fact sheet or the technical reports EPA used to inform its decision making (e.g., EPA SAB, 2011). Therefore, EPA has determined that vessels enrolled in STEP and utilizing their ballast water treatment systems are effectively applying ballast water treatment and are meeting BAT. EPA notes that these vessels are utilizing ballast water treatment technologies designed to meet or exceed the permit limits found in Part 2.2.3.5 of the VGP, and vessels enrolled in STEP are playing and will continue to play a key role in improving our understanding of the efficacy of ballast water treatment systems.

4.4.3.9 Narrative Water Quality Based Effluent Limit Applicable to Ballast Water Discharges

Under CWA section 301(b)(1)(C) and its implementing regulations, in addition to the technology-based effluent limitations discussed above, EPA must include in NDPES permits any more stringent effluent limits "necessary to meet water quality standards." In determining what additional effluent limitations, if any, must be included in a permit, EPA first assesses whether, after application of the technology-based effluent limits, the discharge has the "reasonable potential to cause or contribute to" an exceedance of water quality standards. If EPA finds such reasonable potential exists, the permit must contain effluent limits that are as stringent as necessary to meet water quality standards (i.e., water quality-based effluent limits or "WQBELs"). 40 CFR 122.44(d)(1). Such limits may be expressed non- numerically where numeric limits are "infeasible to calculate." 40 CFR 122.44(k)(3).

As described more fully below, recognizing that the Agency's understanding of the relationship between numbers of living organisms in ballast water discharges and probability of successful establishment by invasive species was extremely limited, EPA (with the US Coast Guard) commissioned the National Academies of Science to draft a report on the issue. The goal was to provide the Agency with the best science upon which to make both its reasonable potential determination and, should reasonable potential be found, the Agency's determination as to what constitutes a limit that is necessary to protect water quality standards (Hanlon et al., 2010). After examining the results of the NAS report, as well as other available information, EPA has determined that, after application of the required TBELs, reasonable potential to cause or contribute to an exceedance of water quality standards exists. However, because of data limitations, EPA has determined that calculation of a numeric WQBEL is infeasible at this time. EPA thus has imposed a narrative WQBEL for ballast water discharges.

In this section, we discuss the charge given by the Agency to the NAS and how the findings of the NAS, as well as other expert sources, informed the Agency's views on whether application of the TBELs would be sufficient to meet applicable water quality standards. We also discuss the basis for the Agency's findings that there is "reasonable potential" and that a numeric WQBEL is "infeasible to calculate." Finally, we discuss the WQBELs for ballast water imposed by this permit.

4.4.3.9.1 EPA's Charge to the NAS

In June of 2011, the National Research Council of the National Academies of Science (NAS) issued their report entitled "Assessing the Relationship Between Propagule Pressure and Invasion Risk in Ballast Water" (NAS, 2011). EPA, in close collaboration with the US Coast Guard, commissioned this Report to inform the development of appropriate water quality-based effluent limits for ballast water discharges. The NAS was asked to:

1. Evaluate the state of the science of various approaches that assess the risk of establishment of aquatic nonindigenous species given certain concentrations of living organisms in ballast water discharges.

2. Recommend how these approaches can be used by regulatory agencies to best inform risk management decisions on the allowable concentrations of living organisms in discharged ballast water in order to safeguard against the establishment of new aquatic nonindigenous species and to protect and preserve existing indigenous populations of fish, shellfish, and wildlife and other beneficial uses of the nation's waters.

3. Evaluate the risk of successful establishment of new aquatic nonindigenous species associated with a variety of ballast water discharge limits that have been used or suggested by the international community and/or domestic regulatory agencies.

EPA developed NAS charge question #2 as a general narrative description of what would be necessary to protect all applicable state WQS. EPA's review of applicable state water quality standards revealed no provisions that specifically address aquatic nuisance species. No states have established numeric water quality standards for living organisms (or ANS); therefore, the focus of EPA's evaluation was on protection of designated uses, narrative criteria, and relevant anti-degradation and general policies of applicable state WQS. While State WQS do not specifically address ANS, many narrative criteria and anti-degradation and general policies of applicable state water quality standards do seek to prevent the types of degradation that is associated with the introduction of ANS into receiving waters. For example, the State of Minnesota has narrative standards which state that "the aquatic habitat…shall not be degraded in any manner…the normal fishery and aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters." Minn. Admin. Rules Ch. 7050.0150 subpart 3. New York's narrative water quality standards require no impairment of "best usages" for pollutants such as toxic and other deleterious substances, suspended solids, and phosphorus. 6 NYCRR section 703.2. Michigan's water quality standards state that "all Great Lakes and their connecting waters…are designated and protected for coldwater fisheries." NREPA Part 31 R. 323.1100(5). "Coldwater fishery use" is defined as "the ability of a waterbody to support a balanced, integrated, adaptive community of fish species which thrive in relatively cold water." NREPA Part 31 R. 323.1043(r). Similarly, although their language does not specifically address aquatic nuisance species, protection of states' designated uses also require safeguarding against aquatic nuisance species introductions, as ANS are commonly associated with impairment of all of the various designated uses in state water quality standards, including industrial uses, public health and welfare uses, and aquatic and wildlife uses (e.g., in Wisconsin, "All surface waters shall be suitable for supporting public health and welfare" Wisc. Admin. Code NR sec. 102.01(7)(a); in New York, most waters "shall be suitable for fish propagation and survival "6 NYCRR § 701.10; Alaska has classes of designated uses for "Growth and propagation of fish, shellfish, other aquatic life and wildlife" 18 AAC § 70.020; California's designated uses provide for "preservation and enhancement of marine habitats" Cal Water Code § 1243; Louisiana has a designated use for "Fish and wildlife propagation" that "includes the maintenance of water quality at a level that prevents damage to indigenous wildlife and aquatic life species associated with the aquatic environment and contamination of aquatic biota consumed by humans" LAC 33:IV.1111; Michigan's "Other Indigenous Aquatic Life" designated use requires that, "At a minimum, all surface waters of the state are designated and protected for other indigenous aquatic life" Mich. Admin. Code R 323.1100.)

4.4.3.9.2 Effectiveness of the TBEL at Addressing Water Quality Impacts

As the NAS concluded, "[i]t is abundantly clear that reducing propagule pressure (i.e., the quality, quantity, and frequency with which living organisms are introduced into a given location) will reduce the probability of invasions, when controlling for all other variables," noting that "[t]here is both strong theoretical and empirical support for this, across a diverse range of habitats, geographic regions, and types of organisms." (NAS, 122). The NAS recommended that "[a]s a logical first step, a benchmark discharge standard should be established that clearly reduces concentrations of coastal organisms below current levels resulting from ballast water exchange (such as the IMO D-2 standard). This will serve to reduce the likelihood of invasion in coastal ecosystems beyond that of the present time." (NAS, p130).. EPA is in this permit establishing numeric effluent limitations at the IMO D-2 standard (the permit's numeric TBEL). EPA concurs with the NAS study that such limitations will result in significant reductions in concentrations of living organisms beyond current management practices (i.e., ballast water exchange and the other management practices described in the permit). The numeric discharge limitations for ballast water in the permit are expected to be effective in reducing the risk from untreated or exchanged ballast water discharges.

A suite of studies have examined the increased environmental protection offered by the IMO discharge standard, and all of them indicate a reduction in risk associated with that standard. Several approaches for evaluating the risk of invasion associated with ballast water discharges are discussed in Lee et al. (2010). Of those approaches, the population viability analysis, per capita invasion probabilities approach, and reaction diffusion models all indicate that reduction of inoculum densities should significantly reduce the risk (either relative or absolute) of invasion from ballast water discharges.

EPA also notes that treatment to the IMO discharge standard will result in a significant decrease in the concentration of living organisms discharged from ballast tanks for the vast majority of vessels applying treatment. Several studies have looked at the composition of living organisms found in ballast water tanks for some or all organisms greater than 50 µm; comparing the results of today's permit limit for this size class to the values presented in the studies illustrates that there would be a substantial decrease in inoculum density after treatment. For example, for each of the studies discussed below, EPA derived the percentage that the discharge concentration would be reduced from the mean, median, or mode values (dependent on the study and how the authors present the data). This percent reduction is 99.67% to 99.94% from mean and mode values presented in Minton et al. (2005),[22] 99.63% from median values presented in Bailey et al. (2011),[23] 99.994% from mean values presented in David et al. (2007),[24] 95.15% from mean values presented Murphy et al. (2002),[25] and 99.93% from mean values presented in

[22] Minton et al. (2005) counted the total number of zooplankton collected from the ballast tanks of 354 ships using 80 µm mesh netting. Hence, as many organisms smaller than 80 µm are not captured, this is likely a underestimate for the total numbers of organisms greater than 50 µm found in the tank. The values presented here were derived by EPA from either those presented by the authors (as the mode values for the density of zooplankton) or based on the density of zooplankton identified in unmanaged ballast water based on visual estimates of Figure 2 of Minton et al. (2005).

[23] Bailey et al. (2011) notes the mean abundance of invertebrates recorded from ballasted ships using 53 µm mesh plankton nets.

[24] David et al. (2007) notes the mean abundance of microzooplankton (20-200µm), macroalgae (200-20,000µm), and zooplankton (200-2000µm) recorded from ballasted ships using unfiltered counts, 50um mesh plankton nets and 100um mesh plankton nets, respectively.

[25] Murphy et al. (2002) determined the average bivalve larvae and crab zoea concentration in ballast tanks of the MV Iron Stuart during 2 voyages at three depths using a 100 µm mesh net. The derived value presented here indicates

Verling et al. (2005).[26] The maximum values presented by the authors show considerably more notable reduction; this is noteworthy because EPA assumes that these high concentration discharge events pose more risk. The discharge concentration would be reduced from the maximum value presented by 99.98% to 99.99% from the range of mean[27] and upper 1.1% of density values presented in Minton et al. (2005),[28] 99.96% from the range of median values presented in Bailey et al. (2011),[29] 99.999% from the range of mean values presented in David et al. (2007),[30] 99.41% from the range of mean values presented Murphy et al. (2002),[31] and 99.97% from the range of mean values presented in Verling et al. (2005).[32]

One specific study, Bailey et. al. (2009) evaluated the efficacy of such limitations through the use of mesocosm experiments and modeling of certain parthenogenetic taxa (i.e, organisms that reproduce asexually) that are of significant concern for invasion to the Great Lakes. In this study, the authors concluded that the proposed IMO standards for >50 micron organisms would reduce the probability of establishment of certain parthenogenic species by three fold. Even taking a "precautionary approach by deliberately investigating establishment success under favourable physical, and chemical, and biological conditions (e.g., reduced competition and predation inside enclosures)" results in "best fit estimates of establishment probabilities for inocula less than 10 individuals m-3 [that] are nil, indicating that the proposed ballast water discharge standards [the IMO standard] will be very effective even for parthenogenetic taxa" (Bailey, 2009, 271).

In short, this clear reduction in inoculum density reduces risk – EPA expects those reductions in risk to be substantial. Hence, EPA believes that requiring treatment to the IMO standard may be protective of water quality standards. However, EPA has nonetheless

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the density of both bivalve larvae and crab zoea identified in ballast water tanks based on visual estimates of Figure 3 and 4 of the publication. EPA notes that this study only looked at a small range of organisms that could be expected to be found in ballast water tanks, and that the value presented is likely significantly conservative (low), and therefore notably underestimates the percent reduction of organisms.

[26] Verling et al. (2005) counted the zooplankton concentration in ballast tanks of vessels during 25 voyages using 80 μm mesh netting. The value EPA used as a basis for calculating the reduction is taken from authors' presentation of the density of zooplankton identified in ballast water immediately before deballasting activities,

[27] When EPA uses the expression "range of" mean, median, or values, this indicates evaluation of all of the mean, median or upper values given by the authors in their respective papers from their results sampling a ballast tank or ballast water discharge. EPA did not pool or average values presented by each respective author. EPA notes that there are challenges in comparing the results of each of these papers with each other because of variations in methods used (e.g., in some studies, all species are enumerated while in others, only target species from select phyla are examined) and differences in how data is presented.

[28]See Footnote 22. Additionally, the max value is the number of zooplankton in the upper 1.1% density of all samples collected in unmanaged ballast water.

[29]See Footnote 23. Additionally, the maximum density of zooplankton identified in unmanaged ballast water based on visual estimates of Figure 2 of Bailey et al. (2011)

[30]See Footnote 24.

[31]See Footnote 25. Additionally, the maximum density values presented here are from both bivalve larvae and crab zoea identified in ballast water tanks.

[32]See Footnote 26. Additionally, the value used to derive percent reduction here is based on the maximum density of zooplankton identified in ballast water among Transatlantic, Atlantic, and Pacific voyages.

determined that the discharge of ballast water has the reasonable potential to cause or contribute to an exceedance of water quality standards, for the reasons discussed below.

4.4.3.9.3 Reasonable Potential Determination for Ballast Water Discharges

In determining that ballast discharges have reasonable potential to cause or contribute to a water quality standards exceedance after imposition of the TBELs imposed by today's permit, EPA looked at existing controls on ballast water discharges (such as ballast water exchange) and the variability of living organisms in the effluent after imposition of this permit's numeric TBELs (the IMO standard after installation of treatment technology). Examination of existing controls is important because the permit's implementation schedule means that not all existing vessels will meet the numeric TBEL at permit issuance. During the time prior to imposition of the numeric limit, and for those vessels not subject to the numeric limit, the other TBELs, such as narrative BMPs in Parts 2.2.3 of the permit and corrective actions in Part 3 of the permit to promptly correct shortcomings, will apply.

As discussed above, the risk of invasion will significantly decrease after installation of treatment technology to meet the permit's numeric TBELs, which are designed to reduce propagule pressure. However, "while inoculum density (e.g., propagule pressure) is a key component of invasion probability, it is but one of scores of variables that can and do influence invasion outcome." (NAS, p4). These variables "include the identity (taxonomic composition), sources, and history of the propagules; their frequency of delivery; and their quality. Further influencing the outcome of propagule release is a host of factors that include both species traits and the recipient region's environmental traits." (NAS, 5). The NAS noted that there are "significant differences between source regions; the diversity, abundance, and density of entrained organisms; and the compatibility of source and recipient regions" (NAS, 5). In evaluating the risk of successful establishment of new aquatic nonindigenous species associated with a variety of ballast water effluent limits, including ballast water exchange and treatment to the IMO standard, the NAS concluded that there is "a profound lack of data and information to develop and validate models," and "it was not possible with any certainty to determine the risk of nonindigenous species establishment under existing discharge limits." (3). EPA expects that compliance with the permit's numeric effluent limitations will likely result in discharges that are controlled as necessary to result in a very small absolute risk of invasion and thus are controlled as necessary to achieve applicable water quality standards. Nonetheless, EPA also finds that the variety of other factors that influence invasion outcome should not be completely ignored, and therefore, even at the IMO level of discharge, reasonable potential exists for such discharges to cause or contribute to violations of applicable water quality standards pursuant to 122.44(d)(1)(ii). Because the reductions in concentrations of living organisms in ballast water achieved by technology meeting the IMO standard are generally superior to that which would be achieved by the application of BMPs either during the time prior to imposition of that limit, or for vessels not subject to the limit, EPA concludes that there is reasonable potential for discharges subject to those limits as well.[33]

[33] As discussed above, in evaluating whether ballast water discharges subject to the technology-based effluent limits in this permit would cause, or have the reasonable potential to cause, or contribute to an excursion above any water quality standard, EPA assessed whether the TBELS were sufficient to "safeguard against the establishment of new

4.4.3.9.4 Ballast Water WQBELs

4.4.3.9.4.1 WQBELs are Infeasible to Calculate

EPA has determined that pursuant to 40 CFR 122.44(k)(3), it is infeasible to calculate numeric water quality-based effluent limit for ballast water discharges. While "[i]n principle, a well-supported model of the relationship between invasion risk and organism release could be used to inform a ballast water discharge standard," (NAS, 5) the "current state of science does not allow a quantitative evaluation of the relative merits of various [numeric] discharge standards in terms of invasion probability." (NAS, 130) Therefore, the lack of available data and information prevents an accurate quantification or estimation of the risk associated with ballast water discharges Though EPA believes that the work done by numerous scientists (Lee et al., 2010, USCG 2008, Drake et al., 2005) has greatly improved our understanding of the risk posed by ballast water discharge events, and some have clearly quantified a relative reduction in risk by using various standards versus ballast water exchange (USCG 2008), EPA agrees with the NAS panel that establishing a precise, quantified ballast water discharge standard more stringent than the numeric TBELs contained in Part 2.2.3.5 of the VGP at this time is not possible with available data and information, and thus, numeric water quality-based effluent limits are infeasible to calculate.[34]

4.4.3.9.4.2 WQBELs in Today's Permit

The narrative WQBEL applicable to all vessel discharges is found in Part 2.3 of the VGP and discussed in section 4.5 of this fact sheet. For ballast water discharges, this narrative WQBEL addresses situations in which reasonable potential exists after application of narrative and numeric TBELs and is included in the permit to meet 40 CFR 122.44(d)(1)'s requirement that the permit include any additional or more stringent requirements than those in the applicable TBELs necessary to "achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality." For those vessels which do not have to immediately comply with the permit's numeric TBEL, and those vessels for which the numeric TBEL is inapplicable, the narrative WQBEL is included for the same reason. In deriving appropriate water quality-based effluent limits for ballast water discharges for today's permit, EPA made every effort to identify generally applicable BMPs beyond those already imposed on a technology basis for ballast water discharges, but except as discussed below for vessels that

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aquatic nonindigenous species and to protect and preserve existing indigenous populations of fish, shellfish, and wildlife and other beneficial uses of the nation's waters." As mentioned, after surveying and evaluating the wide array of state water quality standards, EPA concluded that this characterization accurately captures what would be necessary to protect all water quality standards.

[34] Though EPA believes that each of these approaches has merit, particularly for informing the Agency about relative risk, the Agency acknowledges that *a profound lack of data* has impaired the Agency's ability to calculate a numeric WQBEL based on existing information alone. EPA believes that the models highlighted by Lee et al. (2010), USCG (2008), and others may present a viable option for calculating numeric water quality based effluent limits in the future. However, the Agency notes that, as the NAS panel found, sufficient data to input, calibrate, and validate those models is lacking. Hence, EPA is working with our federal partners to fill many of the data gaps identified by the 2011 NAS ballast water study for use in future iterations of this permit as needed. As additional data are gathered, modeling inputs are further explored and refined, and the state of the science further developed, EPA will reexamine whether numeric water quality based limits for the numbers of living organism in ballast water are feasible to calculate.

uptake ballast water in freshwater and then voyage across the open ocean prior to discharging in the Great Lakes, was unable to do so. EPA thus has determined that it is appropriate to impose the site-specific narrative WQBEL on ballast water discharges.

In Part 2.2.3.7 of the VGP, EPA maintains the existing ballast water exchange requirement for vessels that uptake ballast water in freshwater or brackish water, then voyage across the open ocean before discharging in the Great Lakes. In addition to meeting the effluent standards contained in the Part 2.2.3.5 of the permit, these vessels must also continue to conduct mid-ocean BWE when they have taken on ballast water from a freshwater or brackish water port in the previous month.[35] For purposes of this permit, the brackish water requirements apply when the water taken in is from oligohaline or mesohaline portions of estuaries or other waters (i.e., the intake water has a saltwater concentration of less than 18 ppt[36]). The purpose of this requirement is to add another measure of protection against invasive species to reduce the compatibility of source and recipient regions when freshwater or brackish water is transported via ballast tanks into the Great Lakes. Due to an environmental mismatch, any freshwater species being taken up in the ship's ballasting in fresh or brackish waters, will be shocked by saline water during ballast water exchange before being discharged into the freshwater of the Great Lakes. This BWE exchange requirement, in combination with the treatment requirements, is designed to address the factors other than inoculum density that influence invasion outcomes described above, thus creating additional protection for the Great Lakes freshwater ecosystem. EPA recognizes that the Great Lakes are a unique and valuable resource and that those water bodies have been particularly impacted by the introduction of various invasive species. EPA also recognizes that mid-ocean ballast water exchange is most effective for minimizing risk of invasions for discharges into freshwater ecosystems. Considering these issues, EPA included existing ballast water exchange practices as WQBEL requirements for certain vessels entering the Great Lakes.

EPA believes requiring BWE in addition to the application of effluent limits that reflect available treatment technologies (with the added assurance provided by the narrative WQBEL in Part 2.3 of the permit) will achieve applicable water quality standards, as we expect continued BWE to further decrease the probability that non-native organisms will be introduced into and establish themselves in the Great Lakes. EPA expects such a practice will reduce the number of organisms adapted to freshwater and lightly brackish conditions, (i.e., "high risk" organisms) discharged into the freshwater ecosystem of the Great Lakes, which consequently will result in further reduction in propagule pressure and invasion risk to the Great Lakes. Additionally, for the unique Great Lakes large freshwater ecosystem where BWE is particularly effective, such a practice serves as a back-up in the event that a ballast water treatment system fails. This is important for the Great Lakes where some entities have noted that existing treatment systems have not been widely tested specifically for lentic freshwater environments.

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[35] EPA notes that regulation of the discharge of ballast water mid-ocean is beyond the scope of this permit.

[36] EPA established the limit at 18 ppt because this is a widely scientifically accepted differentiation between salinity levels within estuarine ecosystems. Scientists generally classify estuarine waters as limonitic (freshwater) (salinity less than 0.5 ppt), oligohaline (salinity between 0.5 and 5 ppt), mesohaline (less than 18 ppt), polyhaline (between 18 and 30 ppt), euhaline (between 30 and 40 ppt), and hyperhaline (more than 40 ppt).

As discussed elsewhere in this factsheet, there is considerable uncertainty when it comes to quantifying invasion risk (NAS 2011). However, it is also quite clear that the lower the propagule pressure, the lower the risk (NAS 2011). Furthermore, EPA limited the exchange plus treatment requirement to focus on vessels whose voyage patterns are more likely to result in ballast water discharges which may pose a higher risk of invasion (i.e., those vessels that have recently taken on ballast from freshwater or brackish waterbodies). Because of the current uncertainty with quantifying the invasion risk associated with the IMO standard, and the unique vulnerabilities of the Great Lakes ecosystem, EPA has required the exchange plus treatment requirement as a way to enhance protection for these water bodies. Expert analyses and preliminary experimental research supports use of BWE in addition to treatment as an enhanced means to reduce invasion risks to freshwater ecosystems such as the Great Lakes (Reid, 2012; Briski et al, 2013). The most significant additional "treatment effect" from the exchange would be the biocidal effect of the osmotic shock delivered to freshwater organisms. Such saline biocidal effects would be considerably lower for saline waters exchanged when coupled with the already present treatment effects from the treatment systems[37]; hence, EPA does not believe this is an appropriate additional practice to reduce risks to marine ecosystems where treatment is already imposed. Please see Reid (2012) for significant additional discussion regarding osmotic shock.

EPA notes that it did receive comments from the shipping industry expressing the view that it would be operationally preferable to discontinue ballast water exchange on ships where treatment systems are in place. Based on discussions with U.S. Coast Guard, EPA also notes the international maritime community under the International Maritime Organization (IMO) has adopted the Ballast Water Management Convention which phases out the use of exchange as a ballast water management practice under an implementation schedule. EPA recognizes the desire for international consistency in regulating the maritime industry to avoid disruption of trade and economies. EPA assures the shipping industry that the Agency expects and intends that the practice of ballast water exchange plus treatment requirements contained in today's permit will not be necessary in perpetuity, and may not extend beyond the current permit. As discussed elsewhere in this fact sheet, the numeric TBELs in today's permit, which are consistent with the IMO D-2 standard, are a significant step towards reducing the risk of biological invasions. EPA recognizes that ideally, a single, technology-based method of managing invasion risks from ballast water discharges is preferred to achieve consistency in ship operations, and to avoid the potential complications associated with conducting ballast water exchange. For these reasons, EPA views ballast water exchange plus treatment as an interim strategy that adds an additional, yet currently unquantified, measure of protection against invasive species being introduced into the Great Lakes until understanding of both the performance of first generation treatment

[37] As discussed elsewhere in this fact sheet, ballast water exchange has been shown to be effective in reducing risk of invasion; however, that risk is more prominent for reducing the risk posed by freshwater ANS. Ballast water exchange works for two reasons: increased mortality from osmotic shock for most freshwater and many brackish water organisms and the physical flushing process removing potential ANS from ballast water tanks. For potential marine ANS, EPA believes that dilution alone would not notably reduce the numbers of living marine organisms once that water has been treated with a treatment system to justify its environmental risks, including risks to water quality. The low levels of beneficial effect, if any, are offset by environmental costs include a potentially shorter holding time for the biocides to reduce the numbers of living organisms in ballast tanks before discharge (therefore possibly *increasing* the concentration of potential marine ANS in the discharge), increased carbon emissions, and increased biocide byproduct and residual discharge.

technology and the relationships between ballast water discharges and risk of biological invasions improve. Technological innovations in both treatment systems and measurement methods will likely improve over time, allowing more stringent standards to be set as appropriate to reduce risks of invasions to the Great Lakes.

EPA is committed to working with DOT and USCG to further study ballast water exchange in addition to treatment as it impacts water quality in the Great Lakes. EPA, DOT, USCG, the Canadian Government, and other entities are currently engaged in significant research activities to better understand the relationship between the risk of invasion and ballast water discharge concentrations and the efficacy of BWTS. Prior to the issuance of the 2018 VGP, the agencies intend to further examine the efficacy of exchange plus treatment. The requirement for treatment plus exchange will be retained in future VGPs only if the administrative record supports a decision that use of a BWTS alone is not sufficiently protective Under those circumstances, the requirement for treatment plus exchange can be eliminated. In making these findings and determinations, EPA will coordinate with DOT and USCG. Though beyond the scope of the permit, the Agencies will invite the Canadian government to coordinate on these research endeavors in reducing risks of biological invasions.

The EPA and the USCG will consider adopting standards more stringent than the IMO standard, as appropriate and consistent with each agency's statutory responsibilities to protect the aquatic environment of the U.S. (this Fact Sheet, 77 Federal Register 17254). As treatment systems improve and are able to treat to lower discharge concentrations, the decreased propagule pressure will reduce the risk of invasion to all waters, including the estuarine and marine waters for which exchange plus treatment offers little incremental environmental benefit. Hence, it is the Agency's desire that treatment systems continue to develop, become more effective, and become more efficient, and the Agency supports such actions.

4.4.4 Antifouling Hull Coating Leachate (Part 2.2.4)

The primary constituent of concern in most antifouling coatings is copper, although zinc may also be used as an ingredient. While the rate at which the metals leach from coatings is relatively slow (4 – 17 µg/cm2/day in controlled testing), these coatings can account for significant accumulations of metals in receiving waters of ports where numerous vessels are present. Tributyltin (TBT), a metal based biocide, was historically applied to vessel hulls as an antifouling hull coating. TBT causes deformities in aquatic life, including deformities that disrupt or prevent reproduction. Numerous studies and several peer reviewed publications ((Bentivegna & Piatkowski, 1998; Haynes & Loong, 2002; Negri et al., 2004; Negri & Heyward, 2001; Ruiz et al., 1995; V. Axiak et al., 1995) examine the environmental impacts of anti-foulant paint leachate containing TBT. TBT is also stable and persistent, resisting natural degradation in water bodies. Thus, due to its acute toxicity, TBT is a pollutant of concern to be addressed in this permit. There is a zero discharge standard for TBT and all other organotin compounds under this permit. Furthermore, if there are any vessels with existing exposed TBT coatings, those vessels must either seek individual NPDES permit coverage consistent with Part 1.8 of the permit or overcoat the existing TBT coating. EPA expects that few, if any, vessels have exposed TBT coatings on their hulls. EPA believes that a zero discharge standard for all organotin compounds, including TBT is technologically available based on the availability of other anti-foulant coating options (e.g. copper and silicon) and feasible and economically achievable because few, if any, vessels still utilize TBT as an anti-foulant.

In the United States and many other countries, the use of antifouling paints containing TBT has been phased-out due to concerns about its environmental impacts. The last TBT antifouling paint registration in the United States was voluntarily cancelled in 2005. Furthermore, the use of TBT antifouling paints or entry to port of vessels with TBT coatings is already prohibited by a large number of other countries, including many countries in Europe (see Regulation (EC) No 782/2003 of the European Parliament and the Council of 14 April 2003 on the prohibition of organotin compounds on ships). In addition, the VGP's zero discharge standard for TBT is consistent with the requirements of the Clean Hulls Act of 2010, P.L. 111-281, section X, which implements the Convention on the Control of Harmful Anti-fouling Systems on Ships.[38] The treaty, adopted at the IMO in October 2001, prohibits the use of organotins, like TBT, in anti-fouling paints. The treaty entered into force on September 17, 2008. The United States deposited its instrument of ratification with the IMO on August 21, 2012, and will become a contracting party to the Convention on November 21, 2012.

EPA clarifies that for the purposes of this permit, EPA has prohibited the use of antifouling paints containing TBT or any other organotin compounds (for purposes of a biocide on hulls). In cases where TBT antifouling coatings have been applied to a ship, all residual TBT must be removed from immersed surfaces or a sealer-coat must be applied to prevent any residual TBT leaching into the environment. EPA is unaware of any nonbiocidal use of TBT which would result in a residual presence in antifouling paints; hence, EPA reaffirms that there must be zero discharge of TBT from vessel hulls. Other less toxic organotin compounds such as dibutyltin oxide are used in very small quantities as catalysts in some biocide-free coatings. One class of biocidal-free coatings, which are sometimes referred to as fouling release coatings, produce a low-energy surface (i.e., non-stick) to which fouling organisms cannot firmly adhere. To function properly, the coating surface must remain smooth and intact, and not leach into the surrounding water. Because these less toxic organotins are used as a catalyst in the production of biocide free coatings, such production may result in trace amounts of organotin in anti-foulant coatings. Part 2.2.4 of the VGP authorizes the use of non-biocidal coatings which contains trace amounts of catalytic organotin (other than TBT) under the following conditions:

1) The trace amounts of organotin are not used as a biocide. When used as a catalyst, an organotin compound is not to be present above 2500 mg total tin per kilogram of dry paint.

2) The coating is not designed to slough or otherwise peel from the vessel hull. Incidental amounts of coating may be released by abrasion during cleaning or after contact with other hard surfaces (e.g., moorings).

EPA has identified three types of BMPs for control of other antifouling hull coating leachate. The first type of BMP addresses the contents and application of the coating. EPA recognizes that different coatings options are available and believes that the types of active agents in hull coatings should be selected to minimize potential effects. The practice of applying

[38] The Clean Hulls Act of 2010 replaced the 1988 Organotin Anti-Foulant Paint Control Act.

coatings according to the instructions on the coating's FIFRA label should currently be a BMP for all vessels. Label instructions, or "Directions of Use," provide information about how to apply antifouling coatings so they are efficacious. Coatings applied in an improper manner may contribute to environmental loading without providing the intended protection. Product labels may also provide information on proper disposal of antifouling wastes and wait-times for returning a vessel to the water to optimize coating longevity and performance. This helps to assure that excess amounts of toxins are not applied, that they are not applied too frequently, and that ships are not reintroduced to the aquatic environment before the manufacturer has recommended, providing adequate environmental protection.

In addition, should a vessel operator choose to use a hull coating that does not have a FIFRA label, they must ensure that the coating does not contain biocides or toxic materials that are banned in the U.S. Vessel operators are always encouraged to select the least environmentally harmful coating possible (e.g., use of lower biocide content coatings, lower biocide release rate, non-persistent biocides, or non-biocidal alternatives).

The second type of BMP addresses the need for particular coatings and selection of the type of coating to apply. The selection of an antifouling system for a particular vessel must be made in consideration of the vessel's operational profile, including operating speed, drydocking requirements, and the waters in which the vessel will be operating, because such factors affect the fouling rate of the hull and other underwater areas of the vessel. Fouling on vessels that typically operate at high speeds may be effectively managed with non-stick, low surface energy, antifouling coatings. Vessels traveling in waters with lower fouling pressure (i.e., reproduction and growth of hard- and soft-fouling organisms) and those that spend less time at dock are expected to have a lower fouling rate; consequently, such vessels should be able to use either non-biocidal coating or antifouling coatings with lower biocide release rates. The permit requires that vessel operators minimize the use of antifouling coatings that are designed to control fouling in higher fouling-pressure environs than those in which the vessel is expected to operate. EPA believes these options should be used where feasible rather than opting for more environmentally damaging coatings.

The third type of BMP is accomplished by matching the coating's abilities or strength to drydock cycles. Larger vessels, particularly those used in trade and cargo transport, must adhere to requirements for safety inspections and maintenance activities that dictate how frequently they must be drydocked. The major manufacturers of hull coatings for this industry will typically guarantee the effectiveness of their products for a certain period of time based on ship and operational characteristics, so the owner/operator should match the hull coating choice to the appropriate drydocking interval. By factoring this schedule into the hull coating selection, EPA believes that vessel operators will make better decisions regarding the use of coatings that will sufficiently protect the vessel for the period of time needed without creating additional leachate or wastes.

4.4.5 Aqueous Film-Forming Foam (AFFF) (Part 2.2.5)

The constituents of AFFF can vary by manufacturer, but can include ingredients that are persistent, bioaccumulative, and nonbiodegradable. However, EPA recognizes the desirability of using this type of fire fighting agent for certain classes of fires. Therefore, the permit requirements for AFFF do not apply when the discharge occurs during a fire emergency. If such an emergency discharge occurs, an explanation of the emergency and the need to discharge AFFF must be written in the ship's log or other recordkeeping documentation, as long as it is consistent with Part 4.2 of this permit.

While EPA recognizes that the ability to properly maintain and train personnel on firefighting equipment is an important safety requirement for vessels, EPA believes that there are available practices for maintenance and training which can be conducted in a fashion that is not deleterious to the environment. In addition, vessel owner/operators may decide where they conduct the maintenance, and thus, have the ability to limit where they will discharge. Therefore, BMPs for reducing AFFF discharges focus on maintenance- and training-related discharges of AFFF. EPA believes BMPs that result in any reduction in discharges of AFFF have environmental benefits. For vessels that do not regularly leave waters subject to the permit, EPA has determined that due to the potential environmental effects caused by certain AFFF constituents, maintenance and training discharges must be minimized and should be collected and disposed of onshore. Furthermore, EPA also has found that a less toxic (non-fluorinated), substitute foam is available for use for training purposes. Owner/operators must use these non-fluorinated substitutes for training when practicable and achievable. Because these activities are planned and occur on an infrequent basis (annually or semi-annually), vessel operators can arrange to conduct the activities according to the BMPs required in the permit and in a location that poses the least environmental threat. Hence, if these vessel owner/operators will be using these substances in waters subject to this permit, AFFF must be collected and stored for onshore disposal if technologically feasible unless the vessel uses non-fluorinated or alternative foaming agent. For those vessels for which it is not technologically feasible to collect and store the fluorinated AFFF foam, vessel owner/operators must limit the discharge to that amount necessary to conduct legally required tests. Lastly, if a vessel will discharge, they should do so as far from shore as practicable.

For vessels that regularly leave the territorial sea, discharge of fluorinated AFFF for maintenance and training purposes into waters subject to this permit is prohibited. EPA has determined that the most effective BMP is to conduct maintenance and training activities as far from shore as possible. Discharge amounts for regulatory certification and inspection should still be minimized; and within waters subject to this permit, a non-fluorinated foaming agent must be substituted if practicable and achievable, for the regular foaming agent found in the AFFF. To meet this goal, permittees should use an alternative AFFF formulation that does not contain perfluorinated surfactants.

For all vessels, discharges of AFFF may not occur in or within 1 nm of waters subject to this permit referenced in Part 12.1 of the permit, unless they are discharged for emergency purposes, by rescue vessels for firefighting purposes, or by vessels owned or under contract to do business exclusively in or within 1 nm of these waters. If an emergency discharge occurs in these waters, an explanation of the emergency and the need to discharge AFFF must be written in the ship's log or other recordkeeping documentation, consistent with Part 4.2 of this permit. Those vessels owned or under contract to do business exclusively in or within 1 nm of areas protected either federally, or by a state, must use non-fluorinated AFFF or collect it and dispose of it onshore to the extent feasible.

EPA provided these exceptions to discharges of AFFF to waters listed in 12.1 so that this permit would not interfere with essential emergency management operations. The provision for vessels that are owned or under contract to do business exclusively in or within 1 nm of these waters was provided so that vessels will not have to divert in order to conduct necessary training and maintenance, which would result in additional cost for these vessels and cause other environmental impacts (increased fuel usage and air emissions). However, in order to protect these higher quality waters, these vessel owner/operators must use less environmentally damaging non-fluorinated AFFF.

4.4.6 Boiler/Economizer Blowdown (Part 2.2.6)

The constituents of boiler blowdown discharge vary according to the types of feedwater treatment used, but may include priority pollutants such as antimony, arsenic, cadmium, copper, chromium, lead, nickel, selenium, thallium, zinc, and bis (2-ethylhexyl) phthalate. Discharge volumes are typically less than 300 gallons but the discharge, which consists of steam, water, and sludge, occurs under high pressure (≤1200 psi) and at a high temperature (>325º F) below the water line.

BMPs to reduce impacts from boiler/economizer blowdown additives are based on minimization of their discharge to nearshore or port receiving waters, thus allowing for more mixing. To further mitigate potential impacts, EPA has specified that vessels greater than 400 gross tons that leave the territorial seas at least once per week cannot discharge within 3 nm of shore, except when the vessel remains in waters subject to this permit for longer than the necessary duration between blowdowns, the vessel needs to conduct blowdown immediately before entering drydock, or for safety purposes. EPA selected once per week as the threshold because the necessary frequency of boiler blowdown can vary from approximately once in two weeks to once in a couple of months for many vessels. For these vessels, it is therefore practical and achievable for these vessels to only discharge boiler blowdown further than 3 nm from shore. EPA included the caveat that vessels which remain in waters subject to this permit for more than a week can discharge if a week is longer than the necessary duration between blowdown cycles because the Agency became aware that some vessels need to discharge boiler blowdown more often than once a week. In all cases, boiler/economizer blowdown should be discharged as far from shore as practical. No vessel may discharge boiler/economizer blowdown in waters listed in Part 12.1 of the permit, except for safety purposes.

4.4.7 Cathodic Protection (Part 2.2.7)

The constituents of cathodic protection discharges include ionized zinc, magnesium, or aluminum. As an alternative method, Impressed Current Cathodic Protection (ICCP) systems use direct current from a ship-based source in lieu of current supplied from an oxidizing anode (i.e., sacrificial anode). The discharge from either method of cathodic protection is continuous whenever the vessel is waterborne.

EPA believes that ICCP systems are the environmentally preferable method because these systems eliminate or reduce the need for sacrificial anodes. EPA recommends the use of Impressed Current Cathodic Protection (ICCP) in place of or to reduce the use of sacrificial electrodes when technologically feasible (e.g. adequate power sources, appropriate for vessel hull size and design), safe, and adequate to protect against corrosion, particularly for new vessels. Cathodic protection may be considered technologically feasible if there is an adequate onboard power supply and the vessel hull size and design can be adequately protected by ICCP.

For sacrificial anode systems, EPA believes that requiring vessel operators to utilize the BMP of selecting the least toxic anode material that is practicable, in the order of preference of magnesium, aluminum, then zinc, represents a practicable and achievable approach to reducing impacts from this necessary hull protection operation. Additionally, sacrificial anodes should be used in conjunction with corrosion control coatings to minimize the release of dissolved metals. Furthermore, sacrificial anodes must not be used more than is necessary to adequately prevent corrosion of the vessel's hull, sea chest, rudder, and other exposed vessel areas.

If the vessel owner/operator considers and rejects use of electrode devices with metals that are less toxic, EPA requires that they document why use of the less toxic metal is not technologically feasible and/or economically practicable and achievable. EPA expects such documentation to be a brief explanation, such as "The vessel classifications society mandates that if my vessel type uses a sacrifical anode, it must be zinc, and therefore less toxic options are not available." In addition, EPA is specifying that vessel operators utilize proper BMPs for cleaning and replacing anodes during drydock to reduce excessive flaking or releases from the oxidizing anodes or the dialectic coating from ICCP systems.

4.4.8 Chain Locker Effluent (Part 2.2.8)

When an anchor is onboard and not in use, the anchor chain is stored in the chain locker, which is often equipped with a sump that can accumulate marine organisms as well as residue from the inside of the locker itself, such as rust, paint chips, grease, and zinc. The chain locker sump is emptied either directly overboard or is drained into the bilge tank for later disposal.

BMPs to reduce or eliminate chain locker effluent discharge require the vessel operator to ensure the chain itself is properly cleaned when brought out of the water to reduce the likelihood of transporting marine organisms and sediment. This practice is currently performed by vessels, using their firemain system, to remove sediments and other material. However, EPA believes vessel operators should use this practice routinely and be advised to perform more thorough wash downs to effectively prevent the transport of marine organisms between water bodies.

Additionally, EPA is requiring ocean-going vessels to clean out, rinse, or pump out chain lockers in open waters (greater than 50 nm from shore), if technically feasible, to reduce the chances of transporting organisms to other water bodies where they may cause potential harm. Vessels that leave waters subject to this permit at least once per month are not allowed to rinse or pump chain lockers in waters subject to this permit, unless not doing so would compromise safety. Because these practices are or can be implemented easily by these vessels, EPA believes this BMP is reasonable for this general permit. The requirement to clean chain lockers as part of scheduled drydock maintenance provides additional protection from discharges resulting from chipped paint or oily leaks from machinery.

4.4.9 Controllable Pitch Propeller (CPP) and Thruster Hydraulic Fluid and other Oil to Sea Interfaces including Lubrication Discharges from Paddle Wheel Propulsion, Stern Tubes, Thruster Bearings, Stabilizers Rudder Bearings, Azimuth Thrusters, and Propulsion Pod Lubrication and Wire Rope and Mechanical Equipment Subject to Immersion (Part 2.2.9).

Vessel owner/operators often use lubricants to maintain the functionality and structure of equipment such as wire rope and other mechanical equipment. This permit requires vessel owner/operators to use environmentally acceptable lubricants for oil to sea interfaces unless technically infeasible. Based on public comment received, EPA added the “unless technically infeasible” provision for new vessel owner/operators to account for those instances in which technical limitations may prevent use of an EAL in an oil-to-sea interface. In addition, all vessel owner/operators must apply lubricants and maintain all seals so that discharges do not result in quantities of oil that may be harmful. In the final permit, EPA has clarified that, for purposes of using EALs in oil-to-sea interfaces, technical infeasibility means that no EAL products are approved for use in a given application that meet manufacturer specifications for that equipment, that pre-purchased lubricated products (e.g., wire ropes) have no available alternatives manufactured with EALs, that products meeting a manufacturers specifications are not available within any port in which the vessel calls, or that change over and use of an EAL must wait until the vessel’s next drydocking.

For all applications where lubricants are likely to enter the sea, environmentally acceptable lubricant formulations using vegetable oils, biodegradable synthetic esters or biodegradable polyalkylene glycols as oil bases instead of mineral oils can offer significantly reduced environmental impacts across all applications (EPA 2011c). Other formulations of EALs are also available.

The final permit retains the requirement that before being placed in service, and after periodic lubrication, wire ropes or cables and other equipment must be thoroughly wiped down to remove excess lubricant. However, the final permit clarifies that this is not required if doing so is deemed unsafe by the Master of the vessel.

Constituents of hydraulic and lubricating oils will vary by manufacturer but may include copper, tin, aluminum, nickel, and lead. Up to 20 ounces of oil may be released for every CPP blade that is replaced, with blade replacement occurring several times per month on average. When the blade replacement includes removal of the blade port cover (generally occurring infrequently, less than once per month), it is possible that, in a worst case scenario, five gallons of oil might be discharged into surrounding waters. Normal blade replacement is typically done in drydock unless the blade has been damaged.

The permit includes BMPs to reduce or eliminate CPP hydraulic fluid discharge and require that the seals be maintained in good working order to reduce leakage. In addition, maintenance activities should be conducted while the vessel is in drydock to prevent accidental spillage of oil.

BMPs to reduce or eliminate stern tube oily discharge require that the seals or fittings be maintained in good working order to prevent leakage. Furthermore, except in emergency situations, major maintenance should occur in drydock where oils cannot be released to the environment. If emergency maintenance must occur in the water, the permittee must use an oil boom, or other appropriate spill response resource, to contain any potential oil discharge and must have appropriate spill cleanup materials on hand.

Depending on the type of rudder bearings in use, this discharge can cause oil or grease to be released into the water column. Oil-lubricated bearings are kept at a slightly positive pressure in relation to the outside ambient water pressure and will only discharge into the surrounding water if a leak occurs around the rudder mechanism. Vessels can install hull seals where the rudder penetrates the hull to prevent the type of leaks that could lead to oil discharges.

EPA has determined that discharges of lubricants should generally not occur if vessels are properly maintained. Vessel operators should employ all necessary control measures such as regular maintenance and inspections to ensure that leaks do not occur.

As noted above, today's permit mandates the use of environmentally acceptable lubricants (EALs) in a wide variety of applications. The market for EALs continues to expand, particularly in Europe, where the use of such lubricants is being encouraged through a combination of tax breaks, purchasing subsidies, and national and international labeling programs, which are based on well-defined criteria. Those criteria include the lubricant's toxicity, biodegradability, bioaccumulation rates, and renewable content. Examples of National Labeling programs include Germany's Blue Angel Program, The Swedish Standard, Nordic Swan, and the European Eco-Label Program.

The German Blue Angel Program has criteria for several classes of lubricants, including hydraulic fluids, lubricating oils, and greases. In order to qualify for certification, a lubricant must possess the following characteristics: biodegradability; low toxicity to aquatic organisms; not bioaccumulative; and not containing dangerous components, such as carcinogens or toxic substances as defined by Germany's Ordinance on Hazardous Substances. A product must also pass technical performance characteristics appropriate for its use.

The Swedish Standard has standards for hydraulic fluids (SS 155434) and greases (SS 155470). Evaluation of a lubricant under the Swedish Standard involves evaluation of biodegradability and aquatic toxicity, as well as sensitizing properties of a lubricant formulation and its components (Habereder et al. 2008). The Swedish Standard evaluates biodegradability using ISO test methods (e.g., ISO 9439), and has varying requirements, depending upon class, for renewable resources content (SP 2010). The Swedish Standard is unique because it was conceived and developed as a collaborative project between government and industry. The program has more listed lubricant products, particularly hydraulic fluids, than any national labeling program (IENICA 2004).

The first international labeling program for EALs was the Nordic Swan program, encompassing Norway, Sweden, Finland, Iceland, and Denmark, which was initially introduced for hydraulic oil, two-stroke oil, grease, and transmission and gear oil (IENICA 2004). The Nordic Swan certification addresses biodegradability, aquatic toxicity (OECD 201&202) and technical performance, as well as renewability. The renewability requirement are the highest of all the labeling programs (e.g., at least 65% renewable content for hydraulic fluid, transmission fluid, gear oil, or grease, and at least 50% for two-stroke oil).

Eco-label is considered to be the first major advancement towards creating a single international standard, and is becoming the most generally accepted label. The Eco-label for lubricants was established in 2005, and includes hydraulic fluids, greases, and total loss lubricants, such as two-stroke oils. This labeling scheme consists of seven criteria encompassing biodegradability, aquatic toxicity, bioaccumulation, and the presence of certain classes of toxic substances (Habereder et al. 2008). A complete list of all lubricants that carry the European Eco-Label can be found at http://ec.europa.eu/ecat/.

Additionally, EPA's Design for the Environment Program (DfE) has launched a new initiative to label environmentally friendly lubricants to assist vessel operators in selecting more environmentally friendly products. EPA's DfE program is a voluntary labeling program that works in partnership with industry, environmental groups, and academia to reduce risk to people and the environment by finding ways to reduce or prevent pollution. The DfE program office has worked to ensure that any products meeting their labeling requirements would, at a minimum, meet the requirements of today's VGP. The DfE logo on a product means that the DfE scientific review team has screened each ingredient for potential human health and environmental effects and that—based on currently available information, EPA predictive models, and expert judgment—the product contains only those ingredients that pose the least concern among chemicals in their class. Manufacturers of marine lubricants can partner with EPA DfE to have products tested to ensure that they meet the DfE Standard for Safer Products and ingredient criteria which define the characteristics and toxicity thresholds for ingredients that are acceptable in DfE-labeled products. DfE evaluates bioaccumulation, fate and aquatic toxicity, renewability and technical performance for each ingredient of the product. More information on the DfE program may be found at http://www.epa.gov/dfe/pubs/projects/formulat/saferproductlabeling.htm.

The new requirements in this permit will increase the use of EALs by vessels operating in waters of the United States. Part 7 of the permit defines environmentally acceptable lubricants to denote a lubricant that is biodegradable, exhibits low toxicity to aquatic organisms and has a low potential for bioaccumulation. This iteration of the VGP will further increase the use of these products, which will result in decreased environmental impact from the operational discharges of oil. Because the majority of a lubricant is composed of the base oil, the base oil used in an EAL must be biodegradable. The three most common categories of biodegradable base oils are: 1) vegetable oils, 2) synthetic esters, and 3) polyalkylene glycols. Traditional mineral oils have a small biodegradation rate, a high potential for bioaccumulation and a measurable toxicity towards marine organisms. In contrast, the base oils derived from oleochemicals (vegetable oils and synthetic esters) degrade faster and have a smaller residual, do not bioaccumulate appreciably and have a lower toxicity to marine organisms. Polyalkylene glycol-based lubricants are also generally biodegradable and do not bioaccumulate; however, some PAGs are more toxic due to their solubility. Lower environmental impacts will occur when a greater proportion of base oils are manufactured from non-mineral based oils.

If a vessel owner/operator finds it is technically infeasible to use an environmentally acceptable lubricant for their vessel, the owner/operator must explain why they cannot do so in their recordkeeping documentation, and must note the use of a non-environmentally acceptable lubricant in the vessel's Annual Report.

The information to be documented is intended to be simple, basic, and straightforward. A vessel owner/operator need only keep one brief record of their determination that use of EALs is technically infeasible. For example, if the vessel owner/operator or his authorized representative determines that there is a lack of supporting equipment or use of EALs is incompatible with the operations and/or operating environment of the ship and loads on the system (including faster degradation of the lubricant caused by exposure to seawater in systems designed to allow seawater infiltration). Technical infeasibility may also be determined if a class society says EALs are not appropriate for a particular use, or the vendor has not specified that EALs are appropriate for that piece of equipment (e.g., if a vendor only allows the vessel operator to use approved products and there are no approved EALs), the owner/operator can note that it is not technically feasible to use EALs on this basis.

EPA has found that use of EALs in all oil-to-sea applications on existing vessels (unless technically infeasible) represents BAT. EALs are available and their use is economically achievable (see US EPA, 2011a). In establishing different requirements for new build vessels versus existing vessels, EPA considered the processes employed and potential process changes which might be necessary by some existing vessels to use EALs. If the performance of EALs does not meet the needs of existing equipment onboard existing vessels, the cost of substituting new equipment might be substantial. However, many existing vessels can use EALs which are compatible with their existing equipment. Hence, it is technically feasible for many existing vessels to use EALs, but might not be technically feasible for some existing vessels to use EALs with existing equipment. For these vessels, EPA does not believe it is economically achievable to require those vessels to install new equipment so that they can use these more environmentally friendly lubricants. Using similar reasoning, EPA believes the use of EALs for most oil to sea interfaces for all new build vessels it is less likely to be technically infeasible and would be economically achievable. New build vessels can select equipment during design and construction which is compatible with EALs. Furthermore, vessel owner/operators can design additional onboard storage area for EALs if they choose to use traditional mineral based oil for engine lubrication (thereby needing two types of oils on-hand). Extra storage area needed would be minor. Nonetheless, in the event specific vessel oil-to-sea applications do not allow for use of EALs, EPA has included a "unless technically infeasible" provision.

Use of an environmentally acceptable lubricant does not authorize the discharge of any lubricant in a quantity that may be harmful as defined in 40 CFR Part 110 as these oils still cause many undesirable environmental impacts, though these impacts are potentially less severe than those caused from petroleum based oils.

Lastly, any discharge of oil, including oily materials, from any of these oil to sea interfaces may not result in a discharge that may be harmful as defined by 40 CFR Part 110 or result in the production of a visible sheen.

4.4.10 Distillation and Reverse Osmosis Brine (Part 2.2.10)

Onboard distillation and RO systems discharge brine is essentially concentrated seawater with the same constituents of seawater, including dissolved and suspended solids and metals. Anti-scaling treatments and anti-foaming and acidic cleaning compounds may be injected into the distillation system. The effluent constituents from distillation and RO discharge were found to exceed water quality criteria for several metals, nitrogen, and phosphorus but did not exceed thermal mixing zone standards. These constituents are generally present in the receiving water used in the distillation or reverse osmosis process and are merely concentrated in the distillation or osmosis process.

The BMPs EPA has included in the permit require vessel operators to keep the reject water from coming into contact with materials, products, or wastes which may contaminate the discharge with potentially environmentally harmful substances. The Agency believes that returning the concentrated seawater back to the marine environment should not cause environmental harm if done in areas where the brine can be appropriately diluted by the receiving water.

4.4.11 Elevator Pit Effluent (Part 2.2.11)

Elevator pit discharge will have constituents similar to those found in deck runoff and firemain water, which may include lubricants, cleaning solvents, soot, and paint chips. Tests conducted by EPA and DOD (US EPA, 1999) on Armed Forces vessels discovered that some detected constituents from elevator pit effluent exceeded the most stringent state water quality standards, including total nitrogen, bis(2-ethylhexyl) phthalate, copper, iron, and nickel.

The permit does not authorize the discharge of untreated elevator pit effluent except in emergency situations or when managed with the ship's bilge water. The emergency situation must be documented in the ship's log or other recordkeeping documentation consistent with Part 4.2. The information in today's permit demonstrates that the discharge of untreated elevator pit effluent is not generally essential to the safe operation of a vessel and that it can easily be held for proper disposal or treated with the vessel's bilgewater. Further, the Agency feels that the limited amount of effluent generated and the high likelihood of its contamination at harmful levels can best be addressed by storage of the effluent for treatment and disposal onshore. However, if elevator pit effluent must be managed with the ship's bilgewater, it may be discharged provided the bilgewater/elevator pit effluent meets the requirements of Part 2.2.2.

4.4.12 Firemain Systems (Part 2.2.12)

Firemain water can contain a variety of constituents, including copper, zinc, nickel, aluminum, tin, silver, iron, titanium, and chromium. Many of these constituents can be traced to the corrosion and erosion of the firemain piping system, valves, or pumps. Discharges from the firemain system are allowed under the permit in case of emergency, when necessary to ensure the safety of the vessel and crew, as well as for testing purposes to ensure the system will be operational in an emergency. However, when feasible, the maintenance and training discharges of the firemain should occur outside ports or other shallow waters and outside waters subject to this permit. In addition, EPA believes that the use of firemain systems for anchor chain washdowns is likely to result in benefits by reducing the potential transport of invasive species. Therefore, the discharge of firemain systems is allowed under the permit when pulling the anchor and anchor chain from protected waters in accordance with the anchor washdown requirements of the permit.

4.4.13 Freshwater Layup (Part 2.2.13)

Discharges of freshwater layup effluent include the constituents of the potable water along with residual seawater, any residue that may leach from the condenser while the water is being held, and disinfectants like chlorine or chloramine. The Agency recognizes that disinfectants are necessary to reduce aquatic growth within the condenser system. Therefore, the permit requires that vessel operators reduce the potential for harmful impacts by minimizing the use of these treatment chemicals to the lowest effective level that will meet the needs of the system. EPA believes that this can be accomplished by following the application rate suggestions provided by the treatment manufacturers to keep the discharge of the disinfectants as low as possible.

4.4.14 Gas Turbine Wash Water (Part 2.2.14)

Rates and concentrations of gas turbine wash water discharge vary according to the frequency of washdown with some Navy vessels conducting washdowns as frequently as every 48 hours with over 100 gallons of washwater being generated. Discharges resulting from gas turbine washdown may include cleaning solvents and substances such as naphthalene and other hydrocarbons. Furthermore, due to the nature of the materials being cleaned, there is a higher probability of heavy metal concentrations. Washdown water from gas turbines may not be discharged into waters subject to this permit unless it is infeasible to separately collect this washwater or only conduct washes outside 3 nm. If it is infeasible to separately collect the water, the washwater must be treated by an oily water separator before discharge. Under most circumstances, EPA believes the water generated is of small enough volume that either 1) it can be collected and held for onshore disposal or disposal in waters not subject to this permit provided the discharge meets all other applicable law or 2) vessel operators can wash down gas turbines when they are not in waters subject to this permit.

4.4.15 Graywater (Part 2.2.15)

The volume of graywater generated by a vessel is dependent on the number of passengers and crew. It is estimated that, in general, 30 – 85 gallons of graywater is generated per person per day (Copeland, 2008). Estimates of graywater generation by cruise ships that can accommodate approximately 3,000 passengers and crew range from 96,000 to 272,000 gallons of graywater per day or 1,000,000 gallons per week. Navy designers use a generation standard of 50 gallons per person per day when constructing graywater collection systems.

Graywater discharges can contain bacteria, pathogens, oil and grease, detergent and soap residue, metals (e.g., cadmium, chromium, lead, copper, zinc, silver, nickel, mercury), solids, and nutrients. Of these constituents EPA has found ammonia, copper, lead, mercury, nickel, silver, and zinc concentrations that exceed water quality criteria in the discharge.

Several BMPs are practicable and available for control of graywater impacts. First, vessel operators are required to minimize the production and discharge of graywater while in port. Producing less graywater while in port will result in less volume of graywater discharge in those areas. Secondly, for large vessels that regularly leave waters subject to the permit with the capacity to store graywater for a sufficient period, graywater must be discharged greater than 1 nm from shore while the vessel is underway unless the vessel meets the treatment standards and other requirements contained under Parts 5.1.1 and 5.1.2 or 5.2.1 and 5.2.2 of the permit along with any vessel specific requirements. Releasing large volumes of untreated graywater in nearshore environments, estuarine environments, or in waters with limited circulation is more likely to cause negative environmental impacts. This is because these environments are likely to have higher vessel traffic and, therefore, greater graywater generation and discharge, are more likely to be stressed by other anthropogenic forces, and are likely to have less ability for dilution and assimilative capacity. The provision limiting the discharge of untreated graywater within 1 nm of shore when the vessel has holding capacity is a limit that will help protect these ecosystems. Additional conditions apply to vessels which do not travel more than 1 nm from shore in order to help reduce the discharge of untreated graywater to these environments. EPA does not expect existing vessel owner/operators to install graywater treatment storage capacity. Vessels which have sufficient graywater storage capacity but do not currently treat their graywater to the standards listed in the permit, must utilize onshore treatment when available and economically practicable and achievable. These requirements will reduce their discharges of untreated graywater.

Additionally, soaps and detergents used in any capacity that will be discharged as graywater must be minimally-toxic and phosphate-free, and should be biodegradable where possible unless there is evidence that they would be harmful to the aquatic environment. Not all biodegradable soaps are appropriate for all aquatic environments, but EPA believes that non-harmful varieties will be available in most situations and should be used when they are available. EPA expects that minimally-toxic cleaners and detergents will contain little to no nonylphenols. Phosphate free soap is considered to contain 0.5% by weight or less of phosphates or derivatives of phosphates. Reducing use of these products will reduce acute and chronic impacts of vessels that generate graywater on aquatic waterbodies and will limit eutrophication in all waters that are phosphorus limited ecosystems. Products meeting these standards are currently commercially available. Changes in cost associated with using these products are estimated in the economic analysis.

Vessels that do not travel more than 1 nm from shore shall minimize the discharge of graywater and, provided the vessel has available graywater storage capacity, must dispose of graywater on shore if appropriate facilities are available and such disposal is economically practicable and achievable unless the vessel meets the treatment standards and other requirements contained under Parts 5.1.1 and 5.1.2 or 5.2.1 and 5.2.2 of this permit. Minimize the discharge of graywater when the vessel is not underway.

4.4.15.1 Additional Graywater Requirements for Vessels Operating in the Great Lakes

As discussed above, vessels that are commercial vessels as defined in CWA section 312(a)(10) are not subject to this section. All other vessels subject to this permit must hold all graywater for onshore discharge to an appropriate shoreside facility or must treat the graywater prior to discharging, in accordance with the standards listed in Part 2.2.15.1(ii) when operating on the Great Lakes. These vessels must also conduct monitoring in accordance with Part 2.2.15.2 of the permit, including keeping records.

EPA has included this requirement because the Agency determined that treatment of this waste stream by VGP vessels represents the appropriate level of control. EPA had previously believed that any non-recreational vessel greater than 79 feet treated or otherwise held their graywater when operating on the Great Lakes. However, EPA heard from vessel owner/operators who believe that their vessels do not meet the definition of "commercial vessel" in section 312(a)(10). (The Agency takes no position on whether any individual vessel discussed by these commenters falls within the "commercial vessel" definition.) EPA therefore believes it is appropriate to set limits for any such vessels.

Numerous vessels operating on the Great Lakes currently either hold their graywater for onshore disposal at a sewage treatment plant or treat that graywater using an existing Marine Sanitation Device meeting the 40 CFR Part 140 standards. Hence, holding capacity is present on vessels or treatment devices are available and used for managing graywater from vessels operating on the Great Lakes, and EPA believes most, if not all VGP eligible vessels operating on the Great Lakes should already be meeting these conditions.

Therefore, EPA believes that meeting these standards represents a BPT/BCT level of control. At this time, unlike with Cruise Ships (see sections 7.1 and 7.2 of this fact sheet for discussion), EPA does not have the information necessary to require a more stringent technology-based graywater discharge limit for these vessels.

4.4.15.2 Graywater Monitoring

The requirements in Part 2.2.15.2 of the permit apply to vessels constructed on or after December 19, 2013 which provide overnight accommodation to at least 15 crew, and apply to "non-commercial" vessels operating on the Great Lakes, pursuant to Part 2.2.15.1 of the permit.

EPA is requiring monitoring for vessels subject to 4.4.15.1 above to assure they are meeting the effluent limits in that part. New build vessels which provide overnight accommodation to at least 15 crew are required to monitor, whether they use treatment or not, to help the Agency better characterize the effluent from these permittees, and for those permittees that use treatment, to better understand the efficacy of that treatment. EPA will use this information in the development of the next VGP. EPA has not required monitoring for existing vessels so as to not require the retrofitting needed for graywater systems to install petcock valves or similar sampling ports. Likewise, EPA has not required vessels with fewer than 15 crew and overnight accommodation to monitor because 1) these vessels tend to produce less graywater and 2) these vessels tend to have lower revenues than larger vessels and the costs imposed might be more burdensome for these vessel owner/operators at this time.

Each vessel subject to these requirements must conduct and analyze two samples per year and report the results as part of the vessel's Annual Report. Part 2.2.15.2 states that samples must be taken for BOD, fecal coliform, suspended solids, pH, and total residual chlorine, and that sampling must be conducted in accordance with the 40 CFR Part 136 methods. Fecal Coliform (or *e. coli* as collected) must only be analyzed once per year if vessels have difficulty analyzing the results within recommended holding times. EPA reduced the minimum monitoring frequency for this biological parameter to ease difficulties associated with analyzing the sample in a tight window after collection for one sampling event. Samples taken from non-commercial vessels operating on the Great Lakes must meet the standards specified in Part 2.2.15.1 of the permit. Records of monitoring information must include the date, exact place, and time of sampling/measurements, the individual(s) who performed the sampling/measurements, the date(s) the analyses were performed, the individual(s) who performed the analyses, the analytical techniques/methods used, and the results of such analyses.

All records of the sampling and testing results must be retained onboard in the vessel's recordkeeping documentation for 3 years. If a vessel does not enter waters subject to this permit for the calendar year, the owner/operator does not need to conduct monitoring for that year. However, the vessel's Annual Report must clearly state that the vessel did not enter waters subject to this permit during that year.

4.4.16 Motor Gasoline and Compensating Discharge (Part 2.2.16)

Ambient water is added to fuel tanks as the fuel is used. When gasoline is reloaded to the tanks while in port, the water is discharged. The discharged ambient water may contain traces of gasoline constituents, which generally will contain alkanes, alkenes, aromatics (e.g., benzene, toluene, ethylbenzene, phenol, and naphthalene), metals, and additives. Analyses of compensating discharge have shown that benzene, toluene, ethylbenzene, phenol, and naphthalene may exceed water quality criteria in the discharge.

EPA has included BMP limitations in the permit based on a vessel's ability to treat the compensating discharge using an oil water separator to meet oil limitations of less than 15 ppm. The permit also requires that this discharge be minimized while the vessel is in port, which can be accomplished by disposing of the wastewater onshore where practicable and available.

4.4.17 Non-Oily Machinery Wastewater (Part 2.2.17)

Non-oily machinery wastewater discharge rates vary by vessel size and operation type, ranging from less than 100 gallons per hour (gph) to over 4,000 gph. Constituents of non-oily machinery wastewater discharge include a suite of conventional pollutants, metals, and organics. Many of the specific constituents in the discharge can exceed water quality criteria, including copper, nickel, silver, zinc and a collection of nutrients. Mercury also may be present, but reported concentrations did not exceed the standards.

EPA has determined that non-oily machinery wastewater can be discharged if control measures are instituted to keep the waste stream free of oils and additives that are toxic and bioaccumulative. Alternatively, non-oily machinery wastewater can drain to the bilge.

4.4.18 Refrigeration and Air Condensate Discharge (Part 2.2.18)

This discharge may contain metals from the refrigeration/air conditioning coils and drainage systems, including aluminum, copper, iron, lead, nickel, silver, tin, and zinc. Traces of detergent also may be found in this discharge from the cleaning of refrigerated spaces, as can seawater and freshwater. This waste stream can easily be kept segregated from oily wastes and safely discharged, channeled and collected for temporary holding until disposed of onshore, or drained to the bilge. The permit prohibits refrigeration and air condensate from coming into contact with oily or toxic materials if it is discharged directly overboard. However, if the condensate is collected for internal recycling, it may be subsequently commingled with other oily discharges provided that the combined discharge meets the requirements of Part 2.1.4 and, if applicable, Part 2.2.2.

4.4.19 Seawater Cooling Overboard Discharge (Including Non-Contact Engine Cooling Water; Hydraulic System Cooling Water, Refrigeration Cooling Water) (Part 2.2.19)

The potential constituents of seawater cooling overboard discharge include entrained or dissolved materials from the system itself, including copper, iron, aluminum, zinc, nickel, tin, titanium, arsenic, manganese, chromium, lead, and oil and grease. Based on existing research conducted for the UNDS program, seawater cooling discharge rates can reach as much as 170,000 gallons per minute (gpm) for an in-transit aircraft carrier with copper, nickel, and silver concentrations in the discharge that exceed water quality criteria.

Cooling water also can reach high temperatures with the thermal difference between seawater intake and discharge typically ranging from 5°C to 25°C, with maximum temperatures reaching 140°C. EPA has not prohibited the discharge of the heated seawater because it is infeasible with existing vessel design to prohibit its discharge. However, the Agency believes if vessel operators institute the BMP of reducing discharges to ports or enclosed water bodies, impacts from the heated waters will be reduced. Discharges of seawater can be reduced by using shore based power when electrical systems on board vessels are compatible with the available shore power.

In addition, mud, biota, and other debris can stick to the strainer plates and require periodic clearing. The permit requires that vessel operators incorporate the regular removal of fouling organisms from seawater piping and cooling systems to prevent possible transport of species to other water bodies. The risk of introducing invasive species is reduced considerably when vessel owner/operators remove fouling organisms while at sea (greater than 50 nm from any shore). Hence, vessel owner/operators should clean piping while at sea in lieu of cleaning these systems in waters subject to this permit if they frequently sail far from the coast.

4.4.20 Seawater Piping Biofouling Prevention (Part 2.2.20)

To prevent biofouling of seawater cooling systems, small amounts of biocidal substances are sometimes injected near the seawater intakes to prevent biofouling by any organisms that may have been drawn in along with the cooling water. Seawater that has been discharged after being treated with chlorinating substances will contain free chlorine and reaction products (halamines, free bromine, and halogenated organics).

The requirements of the permit reinforce current environmental regulations established under FIFRA. Under the permit, biofouling chemicals for seawater piping must be used according to their FIFRA label and are prohibited from discharge if they are banned for use in the U.S. A banned pesticide does not simply mean one that is unregistered under FIFRA.

Vessel owner/operators must use the minimum amount of biocide needed to keep fouling under control. Using visual observations, vessel operators can determine if they are achieving the desired level of biofouling prevention with lower concentrations of biocide. If an organic biocide is used, it should have a short half-life. If an oxidizing biocide is being used, the total residual oxidant concentration of the effluent should be monitored periodically to ensure that excessive amounts of biocide are not being released into the environment.

4.4.21 Boat Wet Engine Exhaust (Part 2.2.21)

Large vessels may have one or many smaller vessels onboard that serve purposes ranging from lifeboats to landing craft. These auxiliary vessels may have engines which produce wet exhaust. Wet exhaust can contain nitrogen oxides, sulfur dioxide, hydrocarbons and other organic compounds, carbon monoxide, and particulates. The amount of wet engine exhaust depends on the size of the marine engine, the diameter of the water pump's impeller, and the engine speed, measured as revolutions per minute (RPM). For smaller motors such as outboards, EPA estimates wet engine exhaust discharge rates can range from 5 to 10 gpm when operated between 1,500 and 3,000 rpm. For inboard diesel engines, flows can range from 20 gpm to 30 gpm when the engine operates between 1,500 and 2,000 rpm (Shirwood Pumps, 2011) to more than 100 gpm for larger engines operating above 2,500 rpm. In comparison, for naval vessels, EPA estimates that outboard engines discharge wet exhaust at a rate of 20 gpm while inboard diesel engines have an estimated discharge rate of 150 gpm. The constituents discharged by outboard engines differ from those discharged by inboard engines, due to the different fuel and engine types. For these outboard engines, a handful of organic constituents are estimated to exceed water quality criteria in the discharge. Inboard engines may produce discharges that exceed water quality criteria for polycyclic aromatic hydrocarbons (PAHs). EPA believes that well maintained engines are less likely to cause these exceedances, and is therefore, requiring operators to implement control measures to ensure their engines are maintained in proper working order. Furthermore, vessel owner/operators should use low sulfur or alternative fuels for their vessels to reduce the concentration of pollutants in their discharge.

Vessels that generate wet exhaust must be maintained in good operating condition and functioning according to manufacturer specifications. Vessel operators are encouraged to consider four-stroke engines in lieu of two-stroke engines to minimize the discharge of pollutants to waters subject to this permit. Vessels that use two-stroke engines must use environmentally acceptable lubricants, if feasible. EPA has included this requirement because two-stroke engines tend to release more oil to receiving waters than 4 stroke engines. Use of environmentally acceptable lubricants will reduce the environmental impact of those oils when discharged.

4.4.22 Sonar Dome Discharge (Part 2.2.22)

Sonar domes are typically found on research vessels and may sporadically be found on other vessels covered by this permit. Maintenance on the sonar dome, while typically (but not always) done while a vessel is in dry dock, can involve the release of the inner sonar dome water. In addition, the components of the outside of the sonar dome can leach into the surrounding waters, including antifouling agents, plastic, iron, and rubber. Along with these materials, tin, zinc, copper, nickel, and epoxy paints may be found on the inside of sonar domes. Some of the discharge concentrations of these components can exceed water quality criteria. Discharge rates are estimated at as little as 300 gallons and as much as 74,000 gallons from inside the sonar dome with every repair event.

Because EPA has not identified any available BMP or feasible treatment technology other than zero discharge, this permit requires that water from inside the sonar dome may not be discharged. In addition, vessel operators should not use bioaccumulative biocides on the exterior of sonar domes when other viable alternatives are available.

4.4.23 Underwater Ship Husbandry and Hull Fouling Discharges (Part 2.2.23)

Extensive hull repair that requires the use of significant raw materials or other potentially toxic chemicals should be conducted while the vessel is in drydock when feasible. Owner/operators must take all precautions to minimize the discharge of raw, toxic, or oily materials while doing any underwater vessel repairs, and these discharges must comply with all applicable federal laws. EPA recommends that extensive hull cleaning be conducted when the vessel is in drydock or when the byproducts of the cleaning can be contained and disposed of properly, especially when cleaning hulls using water pressure based systems. This BMP encourages all waste to be collected and disposed of properly to ensure that it is not washed into nearby waters. While these practices do not specifically address the release of antifouling materials from hulls during vessel operations (i.e., hull coating leachate), they are critical to controlling levels of contaminants that result in the same type of environmental degradation. In addition, these same practices will reduce the potential for release of introduced species during hull cleaning and paint preparation activities.

Some vessels are too large to be regularly removed from the water and any repair or maintenance required on the hull or hull appendages must occur while the vessel is pier-side between drydockings. Hull cleaning and repair activities conducted on the water can cause the release of a wide range of constituents, including elements of the vessel hull; hull coatings; cleaning agents; and species that are attached to and are associated with the hull and other submerged areas of the vessel and were transported to non-native waters. Use of minimally-toxic paints (e.g., low surface energy paints) will reduce the discharge of toxic materials into the water column during any cleaning. If cleaning and repair activities on hulls coatings with biocidal activity must take place when the vessel is in the water, certain practices can reduce the potential risks associated with those activities.

EPA has not identified an alternative to underwater ship husbandry, a viable treatment technology, or specific practices that will eliminate all releases of contamination. To limit such releases the Agency is requiring that vessel operators employ removal and cleaning methods that reduce the environmental impacts due to releases of biocides, hull coating materials, and invasive species. EPA has determined that use of soft brushes when cleaning hulls helps eliminate the release of paints and hull materials; hence, you must use the softest brush practicable to effectively remove living organisms from the vessel hull. Furthermore, when available, EPA recommends that vacuum cleaning technologies be employed in conjunction with mechanical scrubbing to reduce releases of environmental contaminants. Vacuum cleaning allows the materials scrubbed from the vessel hulls to be collected and disposed of onshore. These approaches are not widely commercially available; hence, EPA has not required that they must be used in this permit. Dry dock cleaning is the preferred alternative to underwater ship husbandry whenever possible. Additionally, hull husbandry should be minimized in critical habitats for aquatic listed species. The list of critical habitat can be found at: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm; and http://criticalhabitat.fws.gov/crithab/.

In addition, vessel hulls and hull appendages are a potential source for the spread of aquatic nuisance species. Vessel owner/operators must minimize the transport of attached living organisms when they travel into waters subject to this permit from outside the U.S. economic zone or when traveling between COTP zones. Minimization techniques include preventing the hull from fouling using appropriate anti-foulant paint (see 4.4.3.9.4 of this fact sheet) and frequently removing fouling organisms from the hull. In the final permit, EPA included further explanation of management measures necessary to minimize the transport of attached living organisms. Specifically, these measures include: selecting an appropriate anti-foulant management system and maintaining that system, in water inspection, cleaning, and maintenance of hulls, and thorough hull and other niche area cleaning when a vessel is in dry dock. This clarification language was incorporated to provide guidance to vessel owner/operators on how to minimize the transport of living organisms. Furthermore, the clarifying language, while giving vessel owner/operators concrete steps that reduce the risks from introducing new invasive species, maximizes consistency with management principles established in the international guidelines “2011 Guidelines for the Control and Management of Ships’ Biofouling to Minimize the Transfer of Invasive Aquatic Species” (MEPC.207(62)).

4.4.24 Welldeck Discharges (Part 2.2.24)

Potential constituents of welldeck discharges include fresh water, distilled water, firemain water, graywater, air-conditioning condensate, sea-salt residues, paint chips, wood splinters, dirt, sand, organic debris and marine organisms, oil, grease, fuel, detergents, combustion by-products, and lumber treatment chemicals. EPA has determined that control measures can reduce some of the potential impacts from welldeck discharges. The permit, therefore, distinguishes what types of waste may be discharged as welldeck discharges.

Further, EPA is requiring that vessel operators practice good housekeeping to ensure that no garbage or wastes that can cause a visible sheen are discharged. Should these wastes be present, the vessel operator must retain the discharge for onshore disposal.

4.4.25 Graywater Mixed with Sewage from Vessels (Part 2.2.25)

Some vessel operators mix graywater with sewage discharges. Once these two discharge types are commingled, it is impossible to separate out which constituents within the effluent are from which discharge type. Therefore, although discharges of sewage from vessels are exempt from permitting pursuant to CWA section 502(6), all graywater discharges containing sewage are required to meet the relevant standards contained within this permit for graywater including discharge minimization requirements, prohibitions, standards, and other requirements applicable to graywater in Part 2 and Part 5 as appropriate. While not a requirement of this permit, vessel operators should be aware that CWA section 312 and its implementing regulations contain requirements for discharges of sewage from vessels which also apply to sewage mixed with graywater.

4.4.26 Exhaust Gas Scrubber Washwater Discharge (Part 2.2.26)

On October 9th, 2008, the Parties to MARPOL adopted stringent new standards to control harmful exhaust emissions from the engines that power ocean going vessels. These engine and fuel standards are included in amendments to Annex VI of MARPOL. The United States ratified Annex VI on October 8, 2009, and the revised Annex VI entered into force on July 1, 2010.

Annex VI, among other things, requires vessels to reduce their air emissions of sulfur. The allowable sulfur content of fuel will fall in the Emission Control Areas (ECAs), including the Baltic Sea, the North Sea and the English Channel, from 1.5% to 1% in July of 2010 and to 0.1% in January of 2015. A North American ECA (including waters adjacent to the Pacific, Atlantic and Gulf coasts and the 8 main Hawaiian Islands) will become enforceable in 2012 (US EPA, 2010b). Globally, the highest permitted sulfur content of fuel will fall from 4.5% to 3.5% in January of 2012 and to 0.5% in January of 2020.

The IMO developed guidance criteria for the use of exhaust gas cleaning devices, such as SO_x scrubbers, as an alternative to operating on low sulfur fuel. As a component of their analyses, the IMO also set out scrubber washwater criteria in section 10 of the guidelines for Exhaust Gas Cleaning Systems (Resolution MEPC. 170(57)). The IMO has subsequently updated their guidelines in the *2009 Guidelines for Exhaust Gas Cleaning Systems* (IMO Annex 9, Resolution MEPC. 184(59), adopted July 17, 2009). A byproduct of some exhaust gas cleaning technology is the washwater generated by the exhaust scrubbing. This washwater may include suspended solids, nitrates and sulfates (and nitric and sulfuric acids which impact pH), metals, and polycyclic aromatic hydrocarbons (PAHs). Before the washwater is discharged, it generally would need to be processed to remove numerous pollutants.

Exhaust gas scrubbers can be classified as dry scrubbers, wet scrubbers, and hybrid scrubbers. Dry scrubbers do not use washwater to capture sulfur oxides from the exhaust gas and thus to not discharge wastewater into waters of the US. Instead, exhaust gas is passed through a bed of granular solid media such as calcium carbonate ($CaCO_3$), burnt lime (CaO), or hydrated lime ($Ca(OH)_2$), to which the sulfur oxides absorb and react to form gypsum ($CaSO_4$) (Couple Systems, 2010).

There are two main wet scrubber technologies. The first, referred to as seawater scrubbing, is an open-loop design which uses seawater to scrub the exhaust and then discharges the washwater back to the sea following treatment. In a seawater scrubber, the exhaust gases are brought into contact with seawater, either through spraying seawater into the exhaust stream or routing the exhaust gases through a water bath. The sulfur dioxide (SO_2) in the exhaust gas dissolves in the washwater, where it is ionized to bisulphate and sulfite, which are then readily oxidized to sulfate (Karle and Turner, 2007). The ionization also produces acidity, as does the sulfuric acid formed from sulfur trioxide (SO_3). The sulfuric acid in the water then reacts with carbonates and other salts in the seawater to form sulfates which are removed in the washwater

(US EPA, 2009). The washwater is then treated to remove solids and raise the pH prior to discharge back to the sea.

A second type of wet SO_x scrubber is a closed loop system. Fresh water is used as washwater, and caustic soda is injected into the washwater to neutralize the sulfur in the exhaust. A small portion of the washwater is bled off and treated to remove suspended solids, which are held as sludge and disposed of ashore, as with the open loop design. The treated bleed-off washwater can be discharged at open sea or held on board. Additional fresh water is added to the system as needed. While this design is not completely closed loop, strictly speaking, it can be operated in zero discharge mode for a period of time (US EPA, 2009).

Hybrid scrubbers can operate as either open or closed scrubbers. The hybrid systems can operate with either seawater (open loop) or freshwater (closed loop). At sea, the system operates with seawater and, in harbors and estuaries, the system can operate on freshwater in a closed loop system (Aalborg, 2010).

The limits applicable in the VGP apply to wet scrubbers and hybrid scrubbers. Wet scrubbers have been designed to process and remove pollutants before they are discharged. Several trials have been conducted using wet SO_x scrubbers aboard marine vessels, which have demonstrated the capabilities of this technology to remove sulfur emissions from exhaust gas (Entec 2005, EPA 2009). These trials have also provided limited data which characterize constituent concentrations in washwater discharges. The trials aboard three vessels, the *Zaandam*, *Pride of Kent* and *Suula* provided measurements of several washwater constituents including pH and pollutants removed from the exhaust gas (SO_x and NO_x, and the products of their transformation: acidity, SO_4, NO_3 and COD) and particulate matter (PM), (which may contain PAHs, hydrocarbons and metal oxides). Other constituents in seawater scrubber washwater (dissolved metals) were attributable to dissolution of scrubber system materials due to the high acidity of washwater in the open scrubber systems. Neutralization of washwater was achieved by blending with sufficient seawater "reaction water". Washwater was also treated to remove the suspended solids that were attributed to PM removed by the scrubbers. This was accomplished using multicylones (alone or in combination with filtration), or more effectively using an advanced treatment system incorporating coagulation and filtration, floatation and adsorption.

As provided in Part 2.2.26 of the VGP, EPA has a numeric BAT limit in this iteration of the permit which is consistent with the international guidelines established by the IMO. Though marine gas exhaust systems are in the early stages of development, EPA has found that all marine manufacturers are designing and testing systems with these IMO guidelines in mind. Furthermore, these systems are generally based on technologies that have been used in land based applications, and these technologies generally transfer well to ship-based applications.

Furthermore, EPA has found that use of these technologies is economically achievable for several reasons. First, as discussed above, the limits are fundamentally similar to an existing international standard; one to which treatment manufacturers are currently designing their equipment. By adopting these limits, EPA is applying no additional burden. Second, vessel owner/operators may realize cost savings when using lower grade fuel (which requires use of a scrubber) compared to the higher grade, lower sulfur content fuels.

EPA has also included several monitoring requirements for those vessels which use exhaust gas scrubber systems. These requirements are based on the IMO washwater discharge criteria, which are intended to act as guidance for implementing Exhaust Gas Cleaning System (EGCS) designs. The IMO Guidelines state that the criteria should be revised in the future as more data become available on the characteristics of the discharge and its environmental impacts, taking into account any advice given by the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP). Administrations (i.e., ship registry authorities) should therefore provide for collection of relevant data. To this end, IMO requests ship owners, in conjunction with the EGCS manufacturer, to sample inlet water (for background), water after the scrubber (but before any treatment system) and discharge water and to analyze these samples using EPA or ISO test procedures for the following parameters:

- pH
- PAH and oil (detailed GC-MS analysis)
- Nitrate and nitrite
- Metals (Cd, Cu, Ni, Pb, Zn, As, Cr and V)

EPA is supportive of the goals of gathering more information about the functioning of these systems. In order to ensure that the discharges are meeting the required effluent limits in Part 2.2.26 of the permit, EPA has required monitoring of any vessel's exhaust gas scrubber system which discharges into waters subject to this permit. The standards and monitoring requirements listed in Parts 2.2.26.1 and 2.2.26.2 of the permit are consistent with IMO guidelines for exhaust gas cleaning systems in resolution Marine Environmental Protection Committee (MEPC) 184(59). The monitoring requirements require both continuous monitoring by probes, and periodic analytical monitoring. Continuous monitoring of pH, PAHs (when available), turbidity and temperature, the regular calibration of continuous monitoring equipment, and compliance with standard continuous monitoring equipment requirements will ensure that exhaust gas cleaning systems are appropriately operated and maintained. The analytical monitoring requirements are generally consistent with the IMO requirements, meeting IMO goals of generating more information about the functioning of these systems. These additional requirements assure that probes remain accurate, and they generate additional information about other pollutants in order to provide assurance to EPA that constituents within the discharge are not likely to cause or contribute to an exceedance of water quality standards.

EPA made changes to the analytical monitoring requirements between the proposed VGP and this final VGP. Namely, this provision has been amended to require that monitoring must happen 2 times during the first year, with each sampling event being no less than 14 days apart. This is to provide vessel owner/operators with flexibility when they sample, while generating the data needed to evaluate system performance. Vessels then need only sample one time per year thereafter. Furthermore, to better align with IMO, EPA has required the sampling of inlet water (for background), water after the scrubber (but before any treatment system) and discharge water and to analyze these samples Additionally, EPA has removed the analytical monitoring requirements for temperature and dissolved oxygen from the analytical monitoring requirements based on comments submitted on the proposed permit.

Additionally, EPA notes that matrix interference is a known issue for monitoring selenium and arsenic in saltwater samples. During the ESA consultation process, one resource agency raised concerns that existing monitoring data indicated that selenium levels are elevated; however, EPA noted that these elevated levels are likely due to matrix interference. Selenium was only monitored in one of the three reports reviewed by EPA. We have the results from those studies, but do not have the raw laboratory data, including QA/QC information. The sampling method used was EPA 200.8, the same method for which EPA identified matrix interference for arsenic and selenium in EPA's 2010 study on vessel discharges (EPA 2010). Bromines are found in high concentrations in seawater, with an average bromide concentration in typical seawater (35 ppt) around 65 ppm. Notable interference can be observed as low as 100 or 200 ppb (personal communication, Terri White and Robin Costas, 2012). For further discussion, please see Albert and Piziali (2012).

In order for vessel owner/operators to report results to EPA that are not elevated as a direct result of matrix interference, EPA strongly recommends that vessel operators utilize techniques and/or equipment known to reduce or eliminate this interference. These techniques, all of which are consistent with EPA methods 200.8 or 200.9, include Octopole Reaction Cell ICP-MS, Dynamic Reaction Cell ICP-MS, and hydride generation with a graphite furnace. Other ICP-MS approaches can also be taken which minimize such interference; however, as discussed above, owner/operators must use analytical methodologies which correct for this interference.

In respect to other monitoring results, EPA is particularly interested in the results from any PAH analysis. The group of 16 PAHs required by the 2013 VGP is customarily analyzed and measured as individual chemicals, but in the IMO Guidelines the washwater criteria for PAH is set in "phenanthrene equivalents". The rationale for this seems to be that measuring PAH is a surrogate for hydrocarbons and phenanthrene was found to be the most abundant PAH in the analysis of washwater during trials on vessel *Pride of Kent*. Hence, EPA is requiring analytical monitoring of all PAH compounds to ensure that the discharge of PAHs from these compounds does not pose unacceptable risks to receiving waters.

In order to maximize consistency with the IMO guidelines for exhaust gas cleaning systems, today's permit includes a revised discharge standard for washwater from the exhaust gas scrubber treatment system for pH from that proposed in the draft VGP. EPA believes the revised limit is both technically feasible and will ensure the discharge does not pose an unacceptable risk to receiving water. The revised standard requires that the discharge washwater must have a pH of no less than 6.0 measured at the ship's overboard discharge. The proposed limit of no less than 6.5 was modified to better align with the IMO guideline. The IMO guideline includes the following two provisions regarding discharge limits of pH from exhaust gas scrubber washwater:

1. The discharge washwater should have a pH of no less than 6.5 measured at the ship's overboard discharge with the exception that during maneuvering and transit, a maximum difference of 2 pH is allowed between the ship's inlet and overboard discharge; or

2. During commissioning of the unit(s) after installation, the discharged washwater plume should be measured externally from the ship (at rest in a harbor) and the

> discharge pH at the ship's overboard pH monitoring point will be recorded when the plume at a distance of 4 meters from the discharge point equals or exceeds a pH of 6.5. This discharge pH, which is found to achieve a minimum pH of 6.5 in the washwater plume 4 meters from the ship, will become the overboard pH discharge limit. (Resolution MEPC.184(59)).

In the proposed permit, EPA included the first provision of the IMO guideline but did not include the second provision. Several commenters had concerns with not including the second approach, claiming this was imposing a more stringent standard than is currently required internationally. When issuing NPDES permits, EPA typically, for the purposes of compliance monitoring, applies discharge limitations at either 1) the point of discharge into waters of the U.S. or 2) at some point within the control of the permittee. Furthermore, EPA typically requires that the sampling is representative of the monitored activity. Thus, the second provision of the IMO guideline, as written, is inconsistent with that approach. Additionally, EPA believes that it is impracticable to require vessel owner/operators to monitor four meters from their vessel hull on a regular basis – hence, assuring compliance with these numeric limits in the permit would be challenging. However, EPA is interested in maximizing consistency with international standards where the Agency believes that they are reflective of BAT and that those standards protect applicable water quality criteria.

Therefore, EPA has changed the pH limit from 6.5 to 6.0 applied at the point of discharge in order to maximize consistency with the IMO guideline by accounting for some pH buffering likely to occur within the 4 meter range. EPA notes that the lower bound limit of 6.0 is consistent with the BAT analyses developed in effluent guidelines for the vast majority of other industry sectors. These technology based limits provide an acceptable range of 6.0 – 9.0 for pH (e.g., see 40 CFR parts 402, 419, 434, etc.). Also, the permit limit continues to include the additional provision, consistent with the IMO guideline, that the maximum difference allowed between inlet and outlet during maneuvering and transit is 2.0 pH units.

Based on existing monitoring data provided from the trials conducted on the *Zaandam, Pride of Kent* and *Suula*, EPA believes it is reasonable to expect that a properly functioning system can achieve a pH of no less than 6.0 for their washwater discharger. The trial data indicates that the pH of the washwater discharge can range from 5.4 to 7.65 after treatment. The lower bound of the range was measured from the *Zaandam* where it was noted that problems with pumps reduced the flow rates in the scrubber system. The same system, however, also demonstrated higher discharge pH values while in Alaskan coastal waters in 2008 where the mean discharge pH was 6.3. The increase in pH was achieved by raising the volume of reaction water being blended with washwater and lower engine loads. The trial conducted on the *Pride of Kent* included samples taken downstream from the scrubbers, prior to blending with reaction water. The pH values from the untreated washwater ranged from 2.67 to 3.79. However, after blending the washwater with the reaction water, the lowest pH measured in the overboard discharge was 6.15.The trials conducted on the *Suula*, included the addition of sodium hydroxide (NaOH) to the scrubbing water circulation to maintain the process pH and the efficiency of SOx removal. The pH of the discharge was maintained at a value of 7.65. (US EPA, 2011f). Based upon these monitoring data, existing exhaust gas scrubber systems can meet a pH limit of 6.0 at the point of overboard discharge, and therefore, systems are available which can meet the limit.

Therefore, the adjusted limit reflects best available technology and remains substantially similar to an existing international standard.

EPA believes the revised limit will continue to ensure the discharge does not pose unacceptable risks to receiving waters. In addition, given the variability of pH between freshwater and saltwater, the maximum allowed difference of 2.0 units of pH will provide additional assurance that the washwater discharge does not have an adverse impact on the receiving water. For example, the mean pH of ocean surface waters ranges between 7.9 and 8.3. (Bindoff, 2007). For discharges occurring in waters at the higher end of that range (8.3), the washwater discharge pH cannot be below 2.0 units less than the intake, in this case a pH of no less than 6.3. Discharges that occur in fresh or brackish water, which tends to have a lower pH, will be subject to the lower limit of no less than 6.0. For example, the Chesapeake Bay watershed has an ambient pH range of 7.0-8.5. (Waldbusser, 2011). In this case, a washwater discharge would be subject to a pH of no less than 6.0 to 6.5, depending on pH of the receiving water. Therefore, the pH discharge limitations established in this permit will provide reasonable assurance that the discharge will not pose an unacceptable risk to the water quality of the receiving water.

Reporting of both continuous and periodic monitoring of parameters listed in 2.2.26.2.2 and 2.2.26.2.3 is necessary to assure compliance with the permit's limits for this discharge, and will provide EPA with data representative of the discharge being monitored. See 40 CFR 122.48(b). Vessel owner/operators must submit all monitoring results to EPA annually through EPA's e-Reporting system, unless exempted from electronic reporting consistent with Part 1.14 of the VGP.

Additionally, the 2013 VGP retains from the 2008 VGP other requirements to assure that exhaust gas scrubber discharges are consistent with existing US law. Vessel owner/operators must follow all existing regulations, including the prohibition against the discharge of oil, including oily mixtures, in quantities that may be harmful as defined in 40 CFR Part 110. In addition, sludge generated from exhaust gas scrubber washwater may not be discharged in waters subject to this permit.

4.4.27 Fish Hold Effluent

Commercial fishing vessels use different methods to keep seafood fresh after catch. Most seafood is either dead when brought onboard or is killed shortly thereafter, before being stored in a refrigerated seawater holding tank, with the exception of certain shellfish (e.g., crab, lobster), which must be kept alive. The two most common methods of cooling seawater are by mechanical refrigeration or by adding ice. Mechanical refrigeration is common on tenders, purse seiners, and some trawlers, while chipped and slurry ice tanks are more common on trollers, longliners, gillnetters, and some other trawlers.

Fish holds are also often cleaned or disinfected by vessel crews between catches. To rinse the tank, vessel crews use either dockside municipal water supply or surrounding ambient water. Cleaning may simply involve rinsing the tanks, or crews also sometimes add detergents or disinfectants. Crews often use scrub brushes to clean the walls and floor of the fish hold to maximize the removal of organic material. Therefore, fish hold cleaning results in a combination of residual fish hold water and ambient or municipal water and often contains soaps or detergents.

In addition to the pollutants from fish hold cleaning, fish hold effluent also may contain waste fish parts or other materials generated by fish cleaning, unused bait, solids, oils, nutrients, bacteria, and viruses. Fish hold effluent may create scum and foam, produce a visible slick or sheen on surface waters, generate odors, and exert oxygen demand in receiving waters. This discharge also has the potential to introduce ANS into receiving waters.

EPA's 2010 "Study of Discharges Incidental to the Normal Operation of Commercial Fishing Vessels and Other Non-recreational Vessels Less Than 79 feet" concluded that impacts from individual small vessels and individual commercial fishing vessels likely have a minimal environmental impact. However, it concluded that "the impacts are potentially significant where there are high vessel concentrations, low circulation in waters, additional environmental stressors, or pollutant loadings from other sources" (US EPA, 2010a). Reducing fish hold effluent discharges when in port will reduce the amount of fish hold effluent discharged into these particular areas of concern, which might address some of the potential impacts EPA discussed above.

The effluent limits in Part 2.2.27 in the 2013 VGP are common practices that are easily implemented by vessel owner/operators and are designed to reduce the volume of fish hold effluent discharged into sensitive water bodies and to reduce the adverse environmental impact fish hold effluent that is discharged. The requirement to physically separate excess fish waste from fish hold effluent prior to discharge is intended to reduce the volume and concentration of the discharge. Use of physical separation techniques or equipment is consistent with existing fishing vessel practices. For example, most vessels have coarse filters (with screens ½ inch or smaller) to keep solid fish waste from being discharged with liquid effluent (US EPA, 2011g). Another way that vessel operators remove solids is through use of a De-Watering Box (DWB) or Wetpump Separator, which serve as a physical separation barrier. A DWB is standard commercial fishing industry chamber-type separation equipment used by vessel owners and processing plants to separate fishery products from the vessel's chilled seawater. The fish hold contents are pumped directly from the vessel into the DWB chamber by conveyor belt and across a screen grate to separate seawater and organic matter. Screening large solid material from any fish hold effluent discharged overboard will help protect water quality in nearshore waters by limiting the spread of ANS and reducing oxygen demand, odor, nutrients, and any pathogens in unused bait and fish solids.

Discharging fish hold effluent to an available shore-based discharge facility when in port will reduce the amount of fish hold effluent discharged into these nearshore waters. When vessel operators are evaluating whether the facilities are available, factors they should consider include whether the facility has been designed to receive fish hold effluent; whether the vessel and the facility have the infrastructure to transfer the effluent; and whether the transfer would not unduly delay the departure of the fishing vessel. In the absence of available shore-based facilities, use of physical separation techniques or equipment, such as use of DWBs, will assist in protecting nearshore waters, and these approaches can be used to meet the requirements of the VGP. With use of a DWB, after physical separation and wherever possible, the chilled seawater is collected and re-circulated back to the vessel for disposal at sea, or is pumped into the plant's waste water system [At sea disposal, however, must be outside of harbors or other protected and enclosed coastal waters, and outside of other areas where EPA has found that such deposits could endanger health, the environment, or ecological systems in a specific location under the Marine Protection, Research and Sanctuaries Act, 33 U.S.C 1412(d). At sea disposal of such fish wastes at such locations requires a permit under that statute.] When these alternatives are not available, the fish hold effluent that passes through the separation barrier is discharged at the pier. For purposes of the VGP a vessel at a pier may discharge fish hold effluent and fish hold cleaning effluent consisting of refrigerated seawater, provided the water and fishery products (incl. organic matter) are physically separated using a de-watering box-type or similar separation technique, or by screening the outflow valve in the fish hold if shore based facilities are not available.

The onshore treatment provisions are not applicable to discharges from pumped through holding tanks used for the sole purpose of keeping the catch alive before being immediately discharged (e.g., holding tanks on crabbing/lobster vessels). The effluent from this latter type of vessel, which involves the pumping of continuous “once through” ambient water, is less likely to have accumulated the type and volume of biological wastes that otherwise is removed under this permit limitation.

This permit also prohibits discarding unused live bait overboard, unless the bait was caught in that waterbody or watershed. The release of live bait is suspected as having introduced invasive species into new waters. For instance, both the European green crab (*Carcinus maenas*) and the rough periwinkle snail (*Littorina saxatilis*) may have been introduced to the San Francisco Bay as a result of the release of live bait (Cohen et al., 1995). The discharge of all other unused bait overboard is strongly discouraged unless the bait was caught in the same water body or watershed. For purposes of the VGP and this requirement, the term “fish hold” means the area on the vessel where both catch and/or bait are stored. Although the term “waterbody” is not defined in the permit, a rational understanding of the term may be implied, to include a lake, river segment, or reasonably proximate area of ocean. For purposes of these permits, the entire Pacific Ocean should not be considered one waterbody, but regions of an ocean where the ecosystem and species found are similar could be regarded as part of the same waterbody. The prohibition on the discharge of unused live bait will help to prevent the spread or dispersal of potentially invasive species if the bait are invasive species or are contaminated with invasive pathogens. Finally, in Part 5.1.1.1.3 of the 2013 VGP, EPA has required that any cleaners or detergents used to clean the fish hold must be phosphate-free, minimally-toxic, and biodegradable. This Part applies to the cleaning of fish holds. Use of these products will reduce the impacts from fish hold effluent cleaning into surrounding waters.

4.5. Additional Water Quality-Based Effluent Limits (Part 2.3)

This permit includes water quality-based effluent limits (WQBELs) to control discharges as stringently as necessary to meet applicable water quality standards. The provisions of Part 2.3 of the permit constitute additional WQBELs for this permit, and supplement the permit’s technology-based effluent limits in Parts 2.1, 2.2, and 5 (where applicable). Where the implementation of the technology-based requirements in this permit are not sufficient to meet the applicable receiving water’s water quality standards, the permittee may be subject to further WQBELs. Prior to or after permit issuance and authorization to discharge, EPA may require additional WQBELs on a site-specific basis, or require the permittee to obtain coverage under an individual permit, if information in the NOI, required reports, or from other sources indicates that, after meeting the technology-based limits in Parts 2.1, 2.2, and 5 (where applicable) and the WQBELs in Part 2.3, the facility is causing or contributing to an excursion above water quality standards.[39]

Part 2.3 includes the permit limits that are as stringent as necessary to achieve water quality standards, consistent with CWA section 301(b)(1)(C) and 122.44(d)(1). EPA generally expects that vessels that achieve the permit's technology-based limits through the careful implementation of effective pollution control measures and BMPs are likely to already be controlling their vessel discharges to a degree that would make additional water quality-based controls unnecessary. However, to ensure that this is the case, the permit contains additional conditions, which, in combination with the BAT/BPT/BCT limits in this permit, EPA expects to be as stringent as necessary to achieve water quality standards.

EPA notes that the WQBELs included in this permit are non-numeric. EPA relies on a narrative expression of the need to control discharges as necessary to meet applicable water quality standards, and to employ additional controls where necessary to be consistent with applicable WLAs in an approved or established TMDL or to comply with a State or Tribe's antidegradation policies. This is a reasonable approach for this permit because EPA has determined that it is infeasible to calculate numeric water quality based effluent limits for most vessel discharges at this time. EPA reached this determination primarily based on the mobile nature of vessels used in a capacity of transportation. With thousands of water bodies across the country, and the potential for any vessel to discharge into almost any water, it is infeasible for EPA to calculate numeric limits for each vessel for each water body at this time. Furthermore, establishing numeric water quality based limits poses many of the same challenges that EPA faced in setting technology-based discharge limits.

As mentioned, this permit requires that each permittee must control its discharge as necessary to meet applicable water quality standards. EPA generally expects that compliance with the other conditions in this permit (e.g., the technology-based limits, corrective actions, etc.) will result in discharges that are controlled as necessary to meet applicable water quality standards. If the permittee becomes aware, or EPA determines, that the discharge causes or contributes to a standards exceedance, corrective actions and EPA notification are required. In addition, at any time EPA may impose additional, more stringent WQBELs on a site-specific basis, or require an individual permit, if information suggests that the discharge is not controlled as necessary to meet applicable water quality standards. The language in Part 2.3 affirms the permittee's requirement to control its discharges as stringently as necessary to meet applicable water quality standards. EPA reserves the authority to require more stringent requirements where necessary to meet applicable standards, or, alternatively, to require the permittee to apply for an individual permit.

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[39] In using the phrase "excursion above," the permit tracks the language in 40 CFR 122.44(d)(1). There are some instances, however, where pollutants would cause nonattainment of the applicable criterion by lowering the water quality *below* the criterion, as with dissolved oxygen. In such situations, such lowering would be considered an "excursion above" within the meaning of the permit condition.

The purpose of Part 2.3.2 is to include a definition for "impaired waters" so that the scope of the requirements in 2.3.2 can be more readily understood by permittees. Part 2.3.2 defines "impaired waters" as those which have been identified by a State or EPA pursuant to section 303(d) of the Clean Water Act as not meeting applicable State water quality standards. This may include both waters with approved or established TMDLs, and those for which a TMDL has not yet been approved or established. The permit contains additional provisions for vessels discharging pollutants that have the reasonable potential to cause or contribute to an impairment of those specified waters.

Part 2.3.2.1 reiterates that if a vessel discharges to an impaired water without an EPA-approved or established TMDL, EPA can provide the permittee with additional requirements with which to comply. EPA can also impose additional requirements on discharges that are not directly to an impaired water if they cause or contribute to an exceedance in another water body affected by the discharge.

Part 2.3.2.2 outlines the process for imposing additional requirements on permittees when they discharge into waters that have a waste load allocation (WLA) assigned to vessels. During the term of the permit, EPA may inform the owner/operator if such a WLA has been established that applies to their vessel discharges. In addition to requiring permittees to comply with the conditions of the WLA, EPA will also assess whether any more stringent requirements are necessary to comply with the WLA, whether compliance with the permit's existing requirements is sufficient to comply with the WLA, or whether the owner/operator must apply for individual permit coverage (see part 1.8.1).

5. CORRECTIVE ACTIONS (PART 3)

5.1. Purpose of Corrective Action Schedules

The purpose of including a corrective action section in this permit is to assist permittees with effectively meeting effluent limits and implementing the best management practices in this permit. Corrective actions in this permit are follow-up actions a permittee must take to correct problems identified in an inspection; they are a requirement to review and revise control measures and vessel operations to ensure that any problems are eliminated and will not be repeated in the future. The permit makes clear that the permittee is expected to assess why a specific problem has occurred, and document what steps were taken to eliminate the problem. EPA believes this approach will aid vessel owner/operators in reaching compliance with the requirements of the permit quickly. Compliance with many of the permit's requirements, for instance, those related to good housekeeping, reporting, recordkeeping, and some of those related to operation and maintenance requirements can be accomplished immediately, and therefore, are not considered problems that trigger corrective actions.

The permit requires that a corrective action assessment be completed as soon as any of the listed problems are identified. Pursuant to provisions of the permit found in Part 4.2, any problems that constitute violations of permit requirements (instances of noncompliance) must be either noted as part of the vessel's records or reported to EPA. As part of the corrective action assessment found in Part 3.2 of the permit, the owner/operator must give a detailed account of the problem(s) identified, take steps to discover the causes of the problem(s), and outline a schedule for addressing the problem(s). The specific contents of the corrective action assessment are detailed in the permit. This corrective action assessment must be kept with the other recordkeeping documentation required by this permit.

Part 3.3 of the permit outlines types of problems that trigger the need for corrective action and stipulates time periods for implementing actions to remedy deficiencies and violations. EPA emphasizes that these time frames are not grace periods within which an operator is relieved of any liability for a permit violation. When any of the listed problems are identified, such as discovery that effluent limits are being violated, the owner/operator must take steps to ensure the problems causing the violations are eliminated. If the original inadequacy constitutes a permit violation, then that violation is not excused by the time frame EPA has allotted for corrective action, although EPA will consider the timeliness and appropriateness of the corrective action in determining an appropriate response to the violation. EPA assumes that vessel owner/operators will need less time to make minor repairs or change shipboard practices than to make substantial renovation or repair. Time limits are included specifically so that problems are not allowed to persist indefinitely. Failure to take the necessary corrective action within the stipulated time limit constitutes an additional and independent permit violation. The three deadlines for corrective actions are based on how extensive the corrections are. For example:

- A minor adjustment may include altering practices for material or equipment storage that cause contamination during a precipitation or high wave event. Corrective actions to address the underlying cause of the noncompliance and return to compliance and/or complete necessary adjustments or repairs to prevent these effluent violations in the future must be implemented as soon as possible but no more than 2 weeks after the discovery of the problem. For example, if materials caused contamination of the deck washdown water, or bilgewater containing emulsifiers, detergents, or other additives was discharged, then violations have occurred. For a vessel that will leave waters subject to this permit within 2 weeks of discovering the problem, corrective actions must be taken either within 2 weeks after the discovery of the problem, or prior to re-entering waters subject to this permit, whichever is later.

- A major adjustment may include drips or spills from leaky infrastructure, or operations that cause violations, but can be repaired or corrected without the vessel being put into dry dock. These adjustments or repairs could include fixing leaking pipe connections or seals that allow oil or other contaminants to reach discharges; installation of drip pans to prevent equipment spills or machinery area runoff from reaching deck washdown effluent; or requiring additional training of crew on correct compliance procedures if vessel activities are not in compliance with the permit.

  Major adjustments must be made within 3 months. EPA believes that this allows sufficient time to locate the parts or personnel to make the repair or complete the correction. During the period immediately following the initial violation and before the corrective action has been completed, the vessel operator must make every effort to reduce potential environmental harm. If longer than 3 months is required, the appropriate EPA regional office must be notified of why the additional time is needed and a date when the correction is anticipated to be completed. This information must be recorded in the vessel's recordkeeping documentation. For a vessel that will leave waters subject to this permit within 3 months of discovering the problem, corrective actions must be taken either within 3 months after the discovery of the problem, or prior to re-entering waters subject to this permit, whichever is later.

- A major renovation is one that can only be performed in dry dock. This may include such modifications as replumbing waste lines, rerouting drains, or installation of additional holding capacity for select discharge types; or overcoating or removal of TBT on vessels previously coated with this anti-fouling hull coating.

  Major renovations must be accomplished during the next available or scheduled opportunity for dry dock renovations. An owner/operator that has a vessel that is in dry dock after incurring a violation that does not take corrective action to alleviate the identified problem will be in violation of the corrective actions section of the permit for every occurrence or discharge after re-launching the vessel (in addition to any original violations prior to going into drydock). All vessels will need to begin complying with its terms on December 19, 2013; hence vessel operators should consider implementing plans as soon as possible to make necessary renovations or repairs part of their current dry dock scheduling.

EPA will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations.

6. INSPECTIONS, MONITORING, REPORTING, RECORDKEEPING (PART 4)

Pursuant to CWA section 308 and 402(a)(2), 40 CFR 122.43(a), and other applicable implementing regulations, the following requirements have been included in the permit, as discussed below.

6.1. Self-Inspections and Monitoring (Part 4.1)

Vessel self-inspections are required as a means of identifying, for example, sources of spills, broken pollution prevention equipment, or other situations that are or might lead to permit violations and allow the owner/operator to correct the situation as soon as possible. The permit requires self-inspections so that the owner or operator can diagnose and fix problems to remain compliant with the permit. These self-inspections can and must be conducted while the vessel is underway as well as while in port, and are designed to fit easily into other, already established vessel routines. For instance, the permit allows the routine visual inspections to be conducted as part of an existing (or updated) international safety management (ISM) code safety management system (SMS) plan, as long as all the permit requirements are met.

The routine visual inspections required by the permit are reasonable measures of good marine practice that the prudent mariner is already employing to ensure vessel, crew, and environmental health and safety. Inspections must be conducted at least once per week or once per voyage, whichever is more frequent, except that vessels that engage in multiple voyages per day are required to inspect daily, rather than on every voyage. If the vessel hull is not readily visible, it should be inspected when feasible, particularly the portions of the hull above the water line at any given time. During the implementation of the 2008 VGP, EPA developed a "Q & A" to address the frequently asked question of what constitutes a "voyage" under this Part. We repeat the answer to that question below.

For the purposes of VGP section 4.1.1 (including its routine visual inspection provisions), a voyage is generally considered to begin when the vessel departs a dock or other location at which it has loaded or unloaded (in whole or in part) cargo or passengers, and to end after it has tied-up at another dock or location in order to again conduct either of such activities. For example, for a barge on the Mississippi River, such voyage would begin when it departs a location at which it has cargo loaded onto it and end when cargo is unloaded at another location.

EPA has made one substantive change to section 4.1, which is intended to provide some additional flexibility to vessel owner/operators while still meeting the objectives of the self-inspection requirements. Specifically, the permit provides that in situations where multiple voyages occur within a one week period, for example a barge that makes daily voyages (i.e., it conducts cargo operations at a different port every day), the vessel operator may employ a limited visual inspection that targets only those areas that may have been affected by activities related to docking and cargo operations that day. For example, for a vessel that only conducted cargo operations involving one compartment or hold onboard that vessel, the limited visual inspection need only be targeted to that compartment or hold and any appurtenant equipment, e.g., piping and pumps, used that day. The use of such targeted intra-week visual inspections does not in any way serve to relieve permittees of the VGP's minimum requirement that a comprehensive visual inspection be conducted at least once per week. For vessels such as mobile oil and gas rigs, which are in a mode of transportation only when relocating between drill sites, a voyage for purposes of VGP section 4.1.1 is generally considered to begin when the rig departs one site and to end when it arrives at the new site to commence operations which are not transportation-oriented, such as drilling.

For vessels such as harbor tugs, which may be in semi-continuous operation for up to a week within the same harbor and do not carry passengers or cargo, for purposes of VGP section 4.1.1, a voyage is generally considered to begin when the crew or master take charge of the vessel and to end when that crew or master are replaced by another crew or master, at which point a new voyage would begin due to the arrival of the new crew or master. For example, if crew changes occur every seven days on a harbor tug, the voyage begins with crew arrival, ends on day seven with departure of that crew, and a new voyage begins on day seven with arrival of the new crew. A routine visual inspection thus would be necessary during the tenure of the initial crew and also during tenure of the new crew.

Discussion

Section 4.1.1 of EPA's Vessel General Permit (VGP) provides that at least once per week or once per "voyage," whichever is more frequent (but not more than once per day), permittees must conduct a visual inspection of safely accessible deck and cargo areas and all accessible areas where chemicals, oils, dry cargo or other materials are stored, mixed, and used, as well as verifying that monitoring, training, and inspections are logged according to VGP requirements. The routine visual inspections under this VGP section were intended to be measures of good marine practice that the prudent mariner is already employing to ensure vessel, crew, and environmental health and safety (see VGP Fact Sheet section 6.1).

The term "voyage" was previously not defined in the VGP, nor does it have a single clearly understood meaning in the maritime context (see generally, discussion of maritime law "voyage" definitions at http://www.duhaime.org/LegalDictionary/V/Voyage.aspx). In general usage, the term voyage involves a trip by water of some duration (see Webster's New World College Dictionary (4th Ed.), defining "voyage" as "a relatively long journey or passage by water or, formerly, by land"). The lack of a clear commonly understood definition has resulted in questions as to how VGP section 4.1.1 (which uses the term "voyage" as a trigger for some of its requirements) is to be interpreted.

EPA has interpreted the term "voyage" for purposes of VGP section 4.1.1 in order to provide clarity as to when its obligations are triggered. For each situation addressed in the above answer, the analysis began with the general understanding of the term voyage to mean a trip by water of some duration, and for the need to provide easily recognizable discrete beginning and end points so as to clarify what constitutes a "voyage." EPA's interpretation was developed taking into account a variety of underlying vessel usages and the underlying purpose of the visual inspection requirement – to ensure that such inspection occurs when conditions on the vessel have changed in a way that might implicate vessel discharges.

Accordingly, the "general" interpretation, which addresses vessels used in carrying cargo or passengers, takes into account the movement of cargo or passengers onto or off the vessel in defining "voyage." Such an approach ensures that an inspection occurs after a vessel departs following loading or unloading cargo or passengers, as those operations can result in, for example, spillage of cargo material or discarding of rubbish on deck or discharge into the water. For vessels that do not engage in such activities, we necessarily looked to other logical beginning and endpoints to use in defining "voyage," as set out in the second and third paragraph of the answer above. While we generally interpret "voyage" as described above, there are certain classes of vessels where such a definition does not work and, therefore, EPA interprets the terms differently for such vessels as set out in the following paragraph.

Vessels that shift in and out of use as a means of transportation (such as mobile drilling rigs) are operating in a capacity as a means of transportation when moving between sites, and therefore are covered by the VGP during that period, but not when operating in their industrial capacity as a drilling rig (see VGP Fact Sheet section 3.5.2.1 for further discussion). The transition from industrial mode to transportation mode is a change in operation that may affect the nature and characteristics of discharges such that a visual inspection is prudent. Thus, for such vessels we interpret "voyage" in paragraph 2 of the answer above in terms of departure from one site and arrival at a new site to commence non-transportation activities. Harbor tugs, which operate within harbor confines and also do not carry cargo or passengers, are addressed in paragraph 3 of the answer above, which uses the instance of a new crew or master taking over operation of the vessel to determine when a "voyage" begins and ends. This change was chosen as a trigger because, in addition to being a readily identifiable discrete event, it also will result in a visual inspection being performed by incoming sets of crew, thereby ensuring that they become familiar with conditions on the vessel that may implicate vessel discharges.

Lastly, we note the interpretation of "voyage" does not in any way serve to relieve permittees of the VGP's minimum requirement that visual inspection be conducted at least once per week. See VGP section 4.1.1 (stating visual inspections must be conducted at least once per week or per voyage, whichever is more frequent).

Each routine visual inspection must be noted in the official logbook or other recordkeeping documentation, signed by the person conducting the inspection, and must include basic information relating to the inspection. For limited visual inspections, the person conducting the inspection need only initial that the inspections were conducted as an addendum to the documentation of the full "weekly" visual inspection, unless additional potential problems or contamination is found. This documentation establishes a record of inspections conducted for both the owner/operator and EPA to track compliance with the permit. The record can help the owner/operator track which areas of the vessel cause more permit violations or hold the most potential pollution problems. By being aware of and focusing on these areas, the owner or operator can change or establish onboard procedures to make permit compliance easier.

For today's permit, EPA has included provisions allowing for the use of Extended Unmanned Period (EUP) Inspections in lieu of routine visual inspections and other monitoring requirements (e.g., ballast water treatment system functional monitoring) in limited circumstances. EPA included these provisions to better address the unique circumstances of owner/operators of unmanned barges. These inspections may also be used when a vessel enters an extended unmanned period. A vessel is considered to be in an EUP if the vessel is unmanned, fleeted, jacked-up, or otherwise has its navigation systems and main propulsion shut down (e.g., extended lay-up) for 13 days or greater. The EUP inspection is an alternative inspection for fleeted, jacked-up, or similarly situated vessels, which routinely go into temporary or extended periods of lay-up.

A vessel owner/operator or their authorized representative may conduct EUPs in lieu of routine visual inspections if they are up-to-date with all other inspection and reporting requirements found in Part 4 of this permit (including routine and annual inspections) and the vessel owner/operator must not have received any VGP related notices of violation from EPA or its authorized representative or faced any VGP-related enforcement action from EPA within the previous 24 months. EPA has included this provision so that it can ensure that vessel owners/operators previously cited for violations are appropriately implementing the terms of the permit. Self-reported violations do not disqualify a vessel for EUPs, unless EPA notifies the vessel owner to the contrary.

The EUP inspection consists of three primary components: a pre lay-up inspection, a periodic external observation of the vessel and surrounding waters, and a post lay-up routine visual inspection. Additionally, while a vessel is in EUP, only the monitoring and inspection requirements specified in Part 4.1.1.2 will be applicable to the vessel. Once a vessel reenters service and is no longer considered to be in EUP, all applicable monitoring and inspection requirements apply. EPA designed the pre lay-up inspection so that the owner/operator can assure that vessel is in good operating order, there are no leaks or loose materials that may enter any waste stream or be discharged, and that the vessel does not pose an environmental risk while it is unmanned. The periodic external observation of the vessel and surrounding waters is to make sure the vessel continues to not pose an environmental risk, the vessel is adequately secured, and no pollutants (including oily mixtures) are present in surrounding waters which might have originated from that vessel. If any deficiencies are observed while the vessel is in

EUP, the vessel owner/operator must document those deficiencies and take corrective actions to resolve those deficiencies as appropriate. The post lay-up routine inspection is designed to be sure that all terms of the VGP continue to be met before the vessel re-enters active service. As part of this inspection, the owner/operator must document the date the EUP ended, whether fluids (e.g., fuel, ballast water) are at their pre EUP levels, and whether any spills or leaks of oily materials are observed. Any noted deficiencies must be corrected before the vessel re-enters service.

The comprehensive annual inspection requirements include a more detailed, thorough inspection of areas of the vessel that are difficult to inspect on a more regular basis, such as the vessel hull. However, the annual inspection does not require the vessel be placed into drydock. Areas of the vessel that cannot be safely inspected without placing the vessel in drydock should be inspected and documented during the next scheduled drydocking period. The owner/operator should note in the annual inspection report which areas are able to be inspected during drydock only. Annual inspection of these areas ensures they are inspected frequently enough to identify and correct problems. In addition, the annual review of all inspection and monitoring data highlights problem areas of the vessel that may need additional attention. This allows the Master, owner, or operator to establish and implement additional procedures applicable to problem areas to reduce future problems. Additionally, the annual inspection requires that all pollution control equipment be inspected to ensure it is functioning properly. This requirement provides a reminder and opportunity to complete maintenance activities on onboard equipment. Based on public comments, the annual inspection requirements were revised to specify that the areas of inspection include the "vessel hull, including niche areas, for fouling organisms..." The term "niche areas" was included to be consistent with the international inspection guidelines "2011 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species" established in resolution MEPC.207(62).

Owners/operators may use applicable portions of the results from the annual inspections conducted by the Coast Guard or the classification society to meet some requirements of the annual inspection. For example, if the Coast Guard examines the oily water separator, then the owner may note in their inspection report that the Coast Guard had completed the inspection and they would not be required to inspect it again. However, for portions of the vessel that are not inspected by the Coast Guard or classification society for environmental performance, the owner/operator must conduct an inspection to be sure that the vessel is meeting requirements of this permit. Regardless of who conducts the inspections, the owner/operator is responsible for a thorough inspection being conducted and taking corrective actions based on that inspection. If the owner/operator is unsure of the quality of inspections that they will use to fulfill their annual inspection requirement under this permit, EPA strongly recommends they use their own personnel to conduct the full inspection. The owner/operator is ultimately responsible for completion of this requirement.

Each annual inspection must be recorded in the official logbook or other recordkeeping documentation, signed by the person conducting the inspection, and must include basic information relating to the inspection and any corrective actions taken as a result of inspection findings.

6.2. Drydocking Inspection Reports (Part 4.1.4)

Many class societies and the United States Coast Guard require that the vessel operator conduct drydock inspections before relaunching the vessel. Based on discussion with technical experts, EPA assumes most, if not all vessels currently must undergo drydock inspections. When a vessel is in drydock, it is much easier to access a wide range of areas on the vessel that are not easily accessible while the vessel is in water. The thorough examination of the vessel that occurs while it is in drydock provides owners/operators with an additional opportunity to implement the permit's requirements. For example, cleaning the vessel hull of attached organisms is much easier in drydock, and is safer for the environment because any attached organisms can be properly disposed of away from water, minimizing the risk of an introduction of ANS. For any drydock report, the permit requires that it include confirmation that the chain locker, hull, and cathodic protection have been inspected and cleaned, that anti-fouling hull coatings are maintained and applied in accordance with the permit's requirements, and that all pollution control equipment is maintained and properly functioning. In instances where vessel owners/operators have drydock reports conducted by the applicable class society or the Coast Guard, or where the vessel operators prepare another drydock inspection report, the permit requires the owner/operator to make such reports available to EPA or an authorized representative of EPA upon request.

6.3. Recordkeeping Requirements (Parts 4.2 and 4.3)

Written records are useful tools for both the vessel owner or operator and EPA. They allow an owner or operator to assess their own permit compliance by providing an easy way to reference permit requirements that have been met, as well as a way to identify troublesome areas of the vessel that cause more pollution-related issues. They also allow EPA to assess permit compliance. By identifying which areas consistently require more cleaning or repair work, the owner or operator can establish and implement procedures specifically designed to minimize pollution and streamline cleaning and maintenance efforts in those areas.

Much of the information that must be recorded under the permit is the same as the information that is required of vessels equipped with ballast tanks bound for a port or place in the United States by the Coast Guard Regulations at 33 CFR §151.2045. This basic information allows the identification of the vessel, the vessel's travels and itineraries, and responsible parties. While the Coast Guard regulation applies only to vessels with ballast tanks, the requirements of the permit apply to all vessels covered by the permit, whether they have ballast water tanks or not. By using the existing vessel recordkeeping requirements as a framework into which the recordkeeping requirements of the permit fit, EPA has attempted to streamline the requirements, make compliance with the permit simple, and do so without imposing significant additional paperwork on vessel owners and operators. Streamlining the paperwork and recordkeeping requirements (for vessels also covered under Coast Guard regulations) increases compliance and allows EPA to achieve both permit enforcement and environmental protection goals.

The information to be recorded is intended to be simple, basic, and straightforward. There are no specific forms to fill out or file; a permittee need only keep one brief record of each inspection, noting when and how it was completed and any relevant information discovered during the inspection. Inspection records must be kept on the vessel or accompanying tug and may be kept in any form provided they can be made available to the EPA. Examples include the ship's official logbook, the oil record book, shipboard oil pollution emergency plan or other official vessel recordkeeping documentation. There do not need to be multiple copies of the records. Additional requirements include a record of maintenance of specific pieces of equipment that cause discharges covered under the permit and a record of each incidence where a discharge occurs pursuant to a safety or emergency exception (e.g., bilge water 2.2.2, AFFF 2.2.5, boiler blowdown 2.2.6, elevator pit 2.2.11, firemain 2.2.12). This can assist in troubleshooting any future pollution problems by showing how often maintenance was performed, what maintenance or repairs were completed, and how often and under what circumstances emergency exceptions were invoked.

This permit contains provisions reinforcing reportable release requirements. The permit specifically does not allow the discharge of hazardous substances or oil in excess of reportable quantities, even if they are associated with the normal operation of a vessel. This provision has been included to clarify that the permit is not authorizing any reportable quantity releases of any material that were not authorized before issuance of this permit. These spills must be reported as required under 40 CFR Part 110 and 40 CFR Part 117.

Vessels equipped with ballast water tanks are required by the permit to meet the requirements of 33 CFR 151.2045. This requirement applies both to vessels that are already subject to these Coast Guard regulations and to vessels that are not. The USCG regulations establish a recordkeeping system to collect information related to ballast water capacity, uptakes, exchanges, and discharges. In addition, like the 2008 VGP, the 2013 VGP requires the ballast water exchange and saltwater flushing requirements for vessels with ballast water tanks. These vessels that conduct saltwater flushing must note that fact on the Ballast Water Reporting Form, which is found in the Appendix to 33 CFR Part 151, Subpart D. Furthermore, in order to close an information gap in ballast water reporting, crude oil tankers engaged in the Coast Wise trade are also required to submit their ballast water reporting forms to the NBIC as a requirement of this permit.

6.3.1 Electronic Records

Recordkeeping technology is a rapidly changing field. Many vessel operators are increasingly using electronic record keeping systems to create and maintain required records, using software, electronic forms and onboard computer terminals that collect and transmit data electronically to shoreside databases for collection and storage.

For the 2008 VGP, EPA interpreted the permit's recordkeeping provisions to allow for owners/operators to use electronic recordkeeping systems to meet the requirements that "written" records be kept "on the vessel," if those records satisfy the requirements in part 4.2 of the permit, which are designed to ensure that the records are: in a format that can be read in a similar manner as a paper record, legally dependable with no less evidentiary value than their paper equivalent, and accessible to the inspector during an inspection to the same extent as a paper copy stored on the vessel would be. In order to clarify for the purposes of this iteration of the VGP, EPA has explicitly included appropriate factors in Part 4.2 of the permit, and provides further guidance below:

(1) Readability/Legal Dependability

EPA expects the requirements of an electronic recordkeeping system in Part 4.2.1 of the VGP would together generally ensure that records created and/or maintained in such systems are readable and legally dependable with no less evidentiary value than their paper equivalent:[40]

a. From the vessel or tug, and from any other point of access to the electronic recordkeeping system, electronic records, including signatures, certifications, and alterations, can be: (i) displayed to EPA, including its authorized representatives, in a format that can be read in a manner similar to a paper record and that associates data with field names or other labels that give the data contained in the record meaning and context (not solely in a computer code or data string), (ii) easily copied for EPA, including its authorized representatives, to review and access at EPA staff computers using non-proprietary software, and (iii) can easily be printed to paper form;

b. Associated metadata in their native format is preserved and available upon request;

c. Electronic records cannot be modified without detection and are preserved in a manner that cannot be altered once created. For example, any changes to an electronic record are automatically and indelibly recorded in a logically associated (i.e., cryptographically bound) audit trail that records each change made without obscuring the data to which the modification is made or its antecedents;

d. The electronic recordkeeping system automatically identifies any person who creates, certifies, or modifies an electronic record using electronic signatures that meet the same signature, authentication, and identity-proofing standards set forth at 40 CFR § 3.2000(b) for electronic reports (including robust second-factor authentication);

e. Originals of any electronic record are immediately and automatically transferred to and held at a single location by a custodian of records who is not an author, certifier, or modifier of the electronic records. The original electronic record is secured in a fashion that protects it from tampering or destruction;

f. The electronic recordkeeping system automatically identifies: 1) the name, address, telephone number and email address for the custodian of records described in "d" above; and 2) the address and owner of the location where the original electronic record is located. The electronic records and their associated metadata remain available and the discharger/permittee can demonstrate that the records have not been changed in any modification of the record-keeping system or migration to a successor record-keeping system;

g. Clear instructions guide users of the electronic record-keeping system in proper use of the system and unambiguously communicate the legal significance of using an electronic signature device; and

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[40] EPA notes that it may change this guidance at any time, based upon experience with electronic recordkeeping, or any other new information or considerations.

h. Computer systems (including hardware and software), controls, and attendant documentation that are part of the electronic record-keeping system are readily available for, and subject to, agency inspection.

(2) Accessibility

EPA will generally consider electronic records to be accessible enough to be considered to be stored "on the vessel" when the vessel operator is able to, immediately, upon request, provide to government officials or authorized representatives:

a. Paper or electronic copies of requested records required to be maintained pursuant to the VGP; and

b. Electronic access, using hardware and software available on the vessel or tug, to required VGP records via electronic storage on the vessel or tug, or via direct access to an electronic system of records stored elsewhere, provided that the location of the original record is within the United States.

6.4. Reporting (Part 4.4)

6.4.1 Annual Report

The Annual Report replaces the annual noncompliance report and one-time report requirements found in the 2008 VGP by consolidating the requirements of the annual noncompliance report and the one-time report into one reporting form. All instances of noncompliance must be reported as part of the Annual Report, instead of separately, as previously required by the 2008 VGP. Previously, there were no parameters for how an annual noncompliance report was to be submitted; the new Annual Report provides a structured format to alleviate frequent concerns from vessel owner/operators and EPA regarding whether sufficient information was submitted. All permittees must submit an Annual Report for each of their vessels (or a combined annual report as allowed; see section 6.4.2 of the fact sheet below for further discussion) – both those permittees with active NOIs for their vessels and covered vessels less than 300 gross tons and having a capacity of less than 8 cubic meters of ballast water operating in U.S. waters. One Annual Report for each vessel is required per calendar year, except for 2013. Any relevant information from 2013 must be reported in the Annual Report for 2014. Annual Reports for a given calendar year must be submitted to EPA no later than February 28 of the following year. As a condition of having active permit coverage, vessels must submit an annual report. However, if they did not operate in waters subject to this permit during that year, they only need complete identifying information in that report and check that they did not operate in those waters. EPA has included this requirement so that Agency does not unnecessarily seek out vessels with active NOI coverage who did not file annual reports because they are not operating in waters subject to the permit.

EPA also advises that vessel owner/operators covered under the 2008 VGP must submit their annual noncompliance reports (if applicable) for the January 1, 2013 to December 18, 2013 time period consistent with the terms of that permit.

6.4.2 Combined Annual Reports for Unmanned, Unpowered Barges or Vessels less than 300 Gross Tons

Based upon experience from implementation of the 2008 VGP, comments from vessel owners/operators expressing a desire to reduce administrative burden where possible because of unique operational constraints, and the new requirements in this permit for EUPs, EPA has determined that it makes sense to streamline the annual reporting process for owners/operators that have several vessels if they meet certain defined criteria. Therefore, this permit allows owners/operators of multiple vessels to submit one Annual Report (known as the "Combined Annual Report") if they meet all of the conditions listed in Part 4.4.2 of the permit. Those conditions are that the answers for each vessel covered by the report must be the same, no analytical monitoring is required for the vessels' discharges, the report will be submitted electronically, and that none of the vessels have had any instances of noncompliance or identified deficiencies in the previous 23 months, and each vessel must have an active NOI to identify it. Vessels that do not meet these requirements cannot be included in the Combined Annual Report.

EPA has authorized a Combined Annual Report for unmanned, unpowered barges and vessels less than 300 gross tons because many of these vessels are fundamentally similar and have a limited number of discharges. Furthermore, vessel owners/operators may have several thousand barges or several vessels less than 300 gross tons with these similar characteristics. Hence, EPA identified this provision as an efficient way to gather the information without sacrificing data quality while minimizing burden on a significant portion of the regulated universe.

Part 4.4.3 of the permit, "Reportable Quantities of Hazardous Substances or Oil" explains that the release of a reportable quantity of any hazardous substance or oil must be reported to the National Response Center. The National Response Center is staffed 24 hours a day by U.S. Coast Guard personnel, who will ask you to provide as much information about the incident as possible, including: your name, location, organization, and telephone number; name and address of the party responsible for the incident; date and time of the incident; location of the incident; source and cause of the release or spill; types of material(s) released or spilled; medium (e.g. land, water) affected by release or spill; danger or threat posed by the release or spill; number and types of injuries or fatalities (if any); weather conditions at the incident location; name of the carrier vessel, or other identifying information; whether an evacuation has occurred; other agencies notified or about to be notified; any other information that may help emergency personnel respond to the incident. In the case of reporting quantities of hazardous substances or oil, if a report is provided to the National Response Center, it is not necessary to report to EPA as outlined in part 4.4.4 of the permit.

Part 4.4.4 of the permit, "Additional Reporting," provides additional reporting requirements – a requirement to comply with the standard permit reporting provisions in Part 1.13 of the permit, a requirement to timely report to EPA when certain types of noncompliance occur, namely, those that endanger health or the environment. In the case where discharges may affect drinking water supplies, recreational waters, elicit fish kills, or may otherwise endanger human health or the environment, the discharge must be reported orally to the appropriate EPA regional office within 24 hours from the time of discovery, followed by an electronic or written report (per the requirements of Appendix B, section 12(F)) within 5 days.

EPA also encourages operators to report the releases that may have human health ramifications to the appropriate local authorities (e.g., public water supply operator, health department). Follow-up monitoring results must be reported via the electronic system (when available) or in writing to the appropriate EPA Regional Office (Part 3.7) within 30 days of receiving the results. The report should include the permit identification number; vessel name, address and location; receiving water; monitoring data from this and the preceding monitoring event(s); an explanation of the situation; what has been done and shall be done to further reduce pollutants in the discharge; and an appropriate contact name and phone number.

Vessel owners/operators under Parts 5.1, 5.2, and 5.8 of this permit have additional reporting requirements. They must report their monitoring data for their graywater treatment systems (5.1 and 5.2)

6.5. APPLICABILITY OF INSPECTION AND RECORDKEEPING REQUIREMENT FOR VESSELS LEAVING WATERS SUBJECT TO THIS PERMIT

The VGP's inspection and recordkeeping requirements do not apply worldwide. Once vessels enter waters subject to this permit, they must be in compliance with the permit's requirements that apply to their discharges before those discharges occur in waters subject to the permit (which in most cases will be at the moment they enter those waters, because many discharges occur continuously during vessel operation). With respect to how the permit's periodic inspection and reporting requirements apply in situations where a vessel transits in and out of waters subject to the VGP, EPA intends for such conditions to be read in light of what they are – conditions prerequisite to discharge into those waters. Thus, for example, a vessel transiting in and out of waters would be in compliance with the routine visual inspection requirement if the vessel had conducted a compliant inspection in the week prior to discharging or on the voyage during which they will discharge into waters subject to the VGP. EPA does not intend for the permit to be read to require that the weekly inspection also would have had to have occurred, for example, two, three, and four weeks prior to the discharge into waters subject to the permit.

EPA's intent is the same for other periodic inspection requirements - annual inspections must have occurred within a year prior to discharge into waters subject to the permit. Drydock inspection reports are likewise a condition prerequisite to discharge into waters subject to the permit -- because the report is necessary to ensure that discharges covered by the permit meet the requirements of the permit, they are required regardless of whether they were prepared inside or outside of the United States. EPA notes that inspections and recordkeeping are directly related to ensuring that the vessel is in compliance with the permit prior to discharging into waters subject to the permit.

Existing recordkeeping systems could be used or adopted, so long as they contain the necessary information.

7. ADDITIONAL TECHNOLOGY BASED AND RELATED PERMIT REQUIREMENTS BASED ON CLASS OF VESSEL (VESSEL CLASS-SPECIFIC REQUIREMENTS) (PART 5)

7.1. LARGE CRUISE SHIPS (PART 5.1)

Large cruise ships are those ships that provide overnight accommodations and are licensed to carry 500 or more passengers for hire. Requirements for cruise ships authorized to carry 500 or more passengers apply regardless of the actual number of passengers onboard. EPA selected this threshold defining large cruise ships to be consistent with the requirements of "Title XIV—Certain Alaskan Cruise Ship Operations" of the Miscellaneous Appropriations Bill (H.R. 5666) in the Consolidated Appropriations Act of 2001 (P.L. 106-554) (commonly referred to as Title XIV) passed on December 12, 2000. Title XIV set discharge standards for sewage and graywater from certain cruise ships (those authorized to carry 500 or more passengers for hire) while operating in the Alexander Archipelago and the navigable waters of the United States in the State of Alaska and within the Kachemak Bay National Estuarine Research Reserve (referred to here as "Alaskan waters").While most cruise ship vessel discharges are similar to those of other similarly sized vessels, cruise ships have several unique characteristics and discharges for which they require additional permit requirements. Cruise ships provide accommodations and extensive amenities to a large number of passengers. These extensive onboard services provided for guests contribute to the increase in the volume of cruise ship discharges. For example, because these vessels carry a large number of people onboard, they generate considerably more graywater discharges than a container or cargo ship. Other amenities provided, such as photo developing, dry cleaning, and day spas, use and produce chemicals that are toxic to the aquatic environment. Discharges of these substances are not authorized by the permit.

7.1.1 Graywater Management

As previously mentioned, the amount of graywater produced by large cruise ships is many times greater than what is produced by a cargo vessel of similar size. Graywater, especially in such large quantities, can cause environmental harm. The graywater produced by cruise ships may contain high levels of nutrients, pathogens, residual levels of organic material, and cleaning chemicals.

EPA established the numeric effluent limits for graywater found in Part 5.1.1.1.2 (discussed below) because data gathered by EPA demonstrate that technologies are available, as well as economically practicable and achievable, and therefore, would represent BPT and BAT. The treatment technologies that remove non-conventional pollutants also treat conventional pollutants; hence, EPA applied the BAT standard to all pollutants for which the permit proposes standards for graywater. For additional discussion of BAT, BCT, and the requirements of each, please see Part 4.2.3 of the Fact Sheet.

The technology to meet the effluent limits found in Part 5.1.1.1.2 of the permit is currently in use and already required for large cruise ships operating in Alaskan waters which discharge within the territorial seas. EPA anticipates no major physical impediments to installing such technology on large cruise ships, and in fact, many cruise ships are already capable of meeting these standards. There are two systems available that cruise ships typically use to treat graywater: traditional Type II marine sanitation devices (MSDs) and advanced wastewater treatment systems (AWTSs). An in depth discussion of how each system works can be found in the EPA Cruise Ship Assessment Report, Part 2.3, which is available in the docket for this permit. In general, AWTSs are capable of treating graywater and graywater mixed with sewage to more stringent standards than traditional Type II MSDs, and EPA has therefore based the effluent limits in this permit on the AWTSs technology. AWTSs on board cruise ships have been shown to reduce ammonia, total Kjeldahl nitrogen, and total phosphorus by moderate amounts and conventional pollutants such as BOD5, TSS, and fecal coliform substantially. In monitoring conducted by EPA in 2004 and 2005, nitrate/nitrite levels were low and remained relatively unchanged by treatment. Nitrogen and phosphorus are likely taken up by microorganisms in the bioreactor and removed from the system in the waste sludge. Table 3: AWT Effluent Concentrations and Removals[1]Table 3 shows the influent and effluent concentrations for these systems for Cruise Ships in Alaska (adapted from US EPA, 2008a).

Table 3: AWT Effluent Concentrations and Removals[1]

Analyte	**Unit**	**Average Concentration in Cruise Ship AWT Influent[1]**	**Average Conc. (± SE) in Cruise Ship AWT Effluent[2]**	**Percent Removal Ranges[3]**
Fecal Coliform	CFU/100 ml	103,000,000* (61 detects out of 62 samples)	14.5* (26 detects out of 285 samples)	>99
Total Suspended Solids	mg/L	545 (50 detects out of 50 samples)	4.49* (±0.193) (73 detects out of 587 samples)	>99
Biochemical Oxygen Demand (5-day)	mg/L	526 (24 detects out of 24 samples)	7.99* (±0.798) (358 detects out of 568 samples)	>99
pH	SU		99.5% of samples within range of 6.0 to 9.0) (921 detects out of 921 samples)	
Total Residual Chlorine	mg/L		0.338* (±0.129) (41 detects our of 547 samples)	
Ammonia As Nitrogen	mg/L	78.6 (35 detects out of 35 samples)	36.6* (±5.50) (136 detects out of 138 samples)	58 to 74
Nitrate/Nitrite as Nitrogen	mg/L	0.325* (26 detects out of 50 samples)	3.32* (±0.653) (66 detects out of 152 samples)	NC

Table 3: AWT Effluent Concentrations and Removals[1]

Analyte	Unit	Average Concentration in Cruise Ship AWT Influent[1]	Average Conc. (± SE) in Cruise Ship AWT Effluent[2]	Percent Removal Ranges[3]
Total Kjeldahl Nitrogen	mg/L	111 (50 detects out of 50 samples)	32.5* (±3.27) (169 detects out of 170 samples)	70 to 76
Total Phosphorus	mg/L	18.1 (25 detects out of 25 samples)	5.05* (±0.460) (146 detects out of 154 samples)	41 to 98

[1]The data presented in Table 3 represents the treatment of a combined sewage and graywater waste stream. Data in EPA's Cruise Ship Discharge Assessment Report demonstrates that the average concentration in cruise ship AWT influent is of higher strength than the average concentration in untreated graywater alone, but is similar in composition (see Part 2.3.3 p. 2-16; Part 3.3, p 3-9) . Consequently, the combined waste stream data can be used to draw conclusions regarding the treatability of graywater by similar treatment devices.
[2] Based on data collected by EPA in 2004 and 2005.
[3] Based on data collected by ADEC/Coast Guard from 2003 to 2005; data collected by EPA in 2004 and 2005; and data collected through EPA's 2004 cruise ship survey.
"NC" indicates that percent removal not calculated because the effluent concentration was greater than the influent concentration or the analyte was not detected in the influent samples from one or more sampled ships.
* Average includes at least one nondetect value; this calculation uses detection limits for nondetected results.

One recent estimate Choi (2007) stated that the cruise industry estimated that roughly 40% of the International Council of Cruise Lines members' 130 ships (which make up two-thirds of the world fleet) have installed AWTSs, with 10 to 15 more systems added each year (Choi, 2007). In 2006, 23 of 28 large cruise ships that operated in Alaskan waters had AWTSs in order to meet the more stringent discharge requirements required under Title XIV (see subsection 2.2.3 of EPA's Cruise Ship Discharge Assessment Report for additional information). The remainder operated traditional Type II MSDs and held the treated sewage and untreated graywater in double-bottom ballast tanks for discharge outside Alaskan waters. For additional information on Title XIV and cruise ship discharges, please see Part 2 of the EPA's Cruise Ship Discharge Assessment Report.

The standards that EPA has included are also economically practicable and achievable. EPA estimates that the cost of maintaining a graywater treatment system (which treats graywater commingled with blackwater) is $7.09 per passenger (including crew) berth per season. For more information, please see the Economic Analysis accompanying this permit. In addition, EPA considered other impacts that would be caused by the imposition of these standards, such as increased energy use onboard the cruise ships, and found those impacts to be negligible. Cruise ships can expect to expend additional fuel when operating the AWTSs, to generate solid sludge or other waste from these systems, and/or to have additional cost in transporting treated or untreated graywater out of specific waters; however, all of these effects are relatively small.

7.1.1.1 Pierside Limits

While pierside, cruise ship operators are required to use graywater reception facilities if they are reasonably available unless the vessel treats graywater with a device to meet the standards found in Part 5.1.1.1.2 of the permit. If not available, graywater must be held for later discharge beyond 3 nm. These requirements will minimize the volume of pollutants discharged while the cruise ship is pierside or operating in nearshore environments. These restrictions will also reduce the discharge of chemicals, nutrients, and pathogens into harbors and ports, which can be located in ecologically sensitive estuaries, and where there are large numbers of vessels discharging in close proximity. Hence, the cumulative impact of numerous untreated graywater discharges in harbors and ports may be significant. Furthermore, based on responses to surveys with vessel operators and industry representatives conducted as part of the economic analysis, most cruise ship operators have voluntarily agreed not to discharge graywater within 4 nautical miles of shore (CLIA 2006). Large cruise ships have the capacity to hold graywater for a minimum of 1 to 2 days, as evidenced by their ability to hold all wastewaters while sailing in areas such as Glacier Bay in Southeast Alaska, where discharges are generally prohibited under their concession contracts with the National Park Service. According to responses to EPA's 2004 cruise ship survey of large cruise ships operating in Alaskan waters, graywater holding capacity ranged from 5 to 90 hours, with an average holding capacity of 56 hours.

Though the standards specified in the permit do not include numeric limits for nutrients, the systems capable of meeting the other standards in this permit (listed in Part 5.1.1.1.2) have been shown to remove considerable amounts of nutrients and successfully achieve pathogen standards as shown above in Table 3 (US EPA 2008). For the reasons discussed above, approaches to meet these requirements are technologically available and economically practicable and achievable.

7.1.1.2 Operational Limits

The 2008 VGP prohibited the discharge of graywater within 1 nm of shore unless the graywater has been treated to treatment standards in Part 5.1.1.1.2 of the permit. For the 2013 VGP, EPA is requiring that cruise ships may only discharge graywater treated to the standards found in Part 5.1.1.1.2 of this permit within 3 nm from shore. EPA made this change after considering the six factors under 40 CFR § 125.3(c), which sets BAT treatment limits and the efficacy of these treatment systems.

Data from those vessels which discharge graywater effluent (commingled with blackwater) through an AWTS indicate that cruise ships with these treatment systems are consistently able to meet the operational limits contained within this permit. This is despite the fact that, as of the issuance of this permit, some of these systems are starting to age. The systems have been used onboard cruise ships for multiple years, have proven reliable, effective, and significantly reduce pollutants being discharged from cruise ship graywater effluent. Hence, the processes employed and the engineering aspects of installing and using these systems are well understood and clearly appropriate for use onboard these vessels. EPA expects no substantial process changes for the industry from existing practice: as discussed above, EPA believes that a significant portion of vessels are already treating this effluent to the standards found in Part 5.1.1.1.2 and those that are not have significant holding capacity. There may be some vessels which have to dedicate additional holding tanks or may elect to install an AWTS to treat the effluent; however, EPA does not believe this process will be especially challenging, as use of these devices or holding the effluent is common practice among this class of vessels. The non-water quality environmental impacts are minimal: for those vessels treating graywater to the standards found in Part 5.1.1.1.2, EPA assumes that these vessel owner/operators were also using their treatment equipment to treat graywater between 1 and 3 nautical miles. For those vessels which choose not to treat graywater, and therefore either discharge pierside to an onshore facility or discharge it underway outside of 3 nm, these vessels will have to hold their untreated graywater for the time sailing from 1 to 3 nm. Generally, EPA expects the time many cruise ships spend between 1 to 3 nm from shore to be relatively short considering cruise ships' typical voyage patterns (i.e., in ports for lengthy periods, then sailing to and from different ports). Finally, when examining costs, EPA notes that no significant additional costs are expected to be incurred from the 2008 VGP requirements. Vessels which were not previously treating between 1 and 3 nm (but treating within 1 nm) may have marginal increased energy costs and associated costs from extra time spent running the systems. Vessels that were previously holding their graywater may spend slightly more on fuel costs to transport the wastewater effluent further or to offload a greater volume of effluent to onshore facilities. Hence, EPA concluded that graywater treatment systems to meet the limits found in Part 5.1.1.1.2 of the permit are widely available and their use by this class of vessels is economically achievable.

Finally, the graywater discharge standards in this permit are consistent with those for large cruise ships underway in Alaskan waters required under Title XIV. As mentioned, industry information shows that many cruise ships are already meeting the operational standards required by the permit.

7.1.1.3 Limits Applicable to Operation in Nutrient Impaired Waters

Nutrients are a pollutant of concern addressed by this permit. EPA found it not to be economically practicable and achievable to require discharges of graywater to be prohibited in all cases; however, a partial restriction on such discharges would represent the BPT and BAT levels of control. Because discharges of graywater are of particular concern in nutrient impaired waters, the permit contains limits designed to minimize the discharge of graywater in those waters. Under this permit, graywater discharges are not authorized in nutrient impaired waters, unless the length of the voyage through those waters exceeds the ship's holding capacity. If the voyage length does exceed the holding capacity, the cruise ship operator has two options: treat the excess graywater (above the holding capacity) to meet the standards of 5.1.1.1.2 prior to discharging it or dispose of graywater properly onshore (before exceeding capacity). These measures will limit the amount of graywater and the amount of chemicals, nutrients, and pathogens discharged into nutrient-impaired waters. The average holding capacity for graywater, based on EPA's 2004 cruise ship study, is 56 hours. Hence, most cruise ship owners/operators would be able to meet the requirements to hold their graywater as required in the permit.

7.1.1.4 Graywater Treatment Standards

The permit requires the discharge of treated graywater to meet the following requirements: the minimum level of effluent quality specified in 40 CFR 133.102; the geometric mean of the samples during any 30-day period may not exceed 20 fecal coliform/100ml and not more than 10 % of the samples could exceed 40 fecal coliform/100 ml; and concentrations of total residual chlorine may not exceed 10.0 micrograms per liter (µg/l). These graywater treatment standards are based on the Title XIV standards that are published in Coast Guard regulations at 33 CFR 159.309. EPA expects owners of large cruise ships to incur some cost, although these costs are considered affordable, would cause no closures, and should not cause any cruise ship owner/operators to exceed a 1% revenue threshold.

7.1.1.5 Sculleries and Galleys

The permit requires cruise ship operators to use phosphate free detergents in the scullery and galley. Additionally, it requires any degreaser used to be minimally-toxic if the degreaser or its residue otherwise would be discharged as part of any waste stream. The use of phosphate free soaps and cleaners is a simple step toward reducing the amount of nutrients, namely phosphorus, present in graywater discharge. Phosphate free detergents and minimally-toxic detergents are readily available for purchase, are comparably priced, and are an affordable management measure for reducing phosphates and toxic compounds in waste streams. Based on the economic analysis prepared for this permit, the purchase of phosphorus free soaps will result in negligible additional costs for any owner or operator. Hence, use of these more environmentally friendly products is technologically available and economically practicable and achievable.

7.1.1.6 Other Materials

Many of the services provided to cruise ship passengers use toxic chemicals that can end up in the graywater discharge (US EPA 2008a). These include dry cleaning operations, photo developing, medical services, and spa and salon services. The permit requires that other materials, including waste from mercury containing products, dry cleaners or dry cleaner condensate, photo processing labs, medical sinks or floor drains, salon floor drains, chemical storage areas, and print shops using traditional or non-soy based inks and chlorinated solvents be prevented from entering the ship's graywater, blackwater, or bilge systems. Discharges of these materials are not eligible for coverage under this permit. There are several ways that ship owner/operators can prevent these materials from entering the graywater, blackwater, or bilge systems, including plugging any drains that lead to the graywater, blackwater, or bilge systems in areas where these wastes are produced, creating alternative waste receptacles, or replumbing drains to appropriate holding tanks. Drain plugging, alternative waste receptacles, and/or re-plumbing would allow the chemicals to be stored and properly treated. Also, in order to prevent the addition of known toxic materials to waters subject to this permit, the permit prohibits addition of toxic materials, including products containing acetone, benzene, or formaldehyde, into spa or salon sinks or floor drains if those sinks or drains lead to any system which will ever discharge into waters subject to this permit. Due to the highly toxic nature of these materials, they must be sent to an alternative waste receptacle or holding tank and cannot be discharged into waters subject to this permit or allowed to enter any discharge stream which later discharges into waters subject to this permit.

Based on information collected as part of the economic analysis, all cruise ship owners and operators are already taking these measures. For any vessels that have not yet taken these measures, EPA expects these preventive measures to be technologically available and economically practicable and achievable.

7.1.1.7 Pool and Spa Discharges

Pool and spa water may also be added to the graywater treatment systems; however, it must still be de-chlorinated and/or debrominated prior to discharge subject to this permit. In addition, the effluent discharged from the graywater treatment system must meet all treatment standards found in Part 5.1.1.1.

Discharges from pools and spas are authorized under this permit, provided that if they use chlorination or debromination, they are dechlorinated and/or debrominated. To be considered dechlorinated, the total residual chlorine in the pool or spa effluent must be less than 100µg/l if the pool or spa water is discharged without going through an advanced wastewater treatment system. To be considered debrominated, the total residual oxidant in the pool or spa effluent must be below 25µg/l if the pool or spa water is discharged without going through an advanced wastewater treatment system. EPA determined the dechlorination limits by using those established for ballast water treatment systems and by evaluating comments submitted by public commenters that indicated such limits are achievable. Furthermore, this limit is consistent with common dechlorination limits from shore based sewage treatment facilities. In addition, the permit provides that vessel owners/operators may only discharge pool or spa water while the vessel is underway; hence, EPA anticipates that this discharge will be significantly diluted.

7.1.2 Monitoring Requirements (Part 5.1.2)

Cruise ship operators must complete specific monitoring steps to document compliance with graywater treatment and discharge requirements under the permit. The monitoring requirements for large cruise ships are similar to those required by the Coast Guard regulations implementing Title XIV published at 33 CFR 159.309. These monitoring requirements are required by the U.S. Coast Guard for Alaskan cruise ship operators that discharge graywater and sewage within nearshore Alaskan waters. EPA evaluated these monitoring requirements and elected to use the same standards to remain consistent with the Coast Guard. The monitoring regime selected is sufficient to show that the systems are properly functioning before large cruise ships enter domestic territorial seas and that the systems are properly maintained.

The monitoring requirements in this permit delineate a specific schedule for sampling, testing, and reporting, in compliance with the requirements of 40 CFR 122.44 and 122.48. Permittees need to use test methods that are listed in 40 CFR Part 136 for all constituents sampled. The monitoring requirements will yield data representative of the discharge being monitored, allowing both EPA and permittees to accurately evaluate both compliance and the effectiveness of the permit requirements. The requirements include monitoring, sampling, and testing for specific parameters likely to be present in the effluent. These measurements characterize treatment efficacy and enable documentation of permit compliance. Monitoring results need to be reported annually, following reporting of initial monitoring to establish the efficacy of the treatment system (see below).

7.1.2.1 Untreated Graywater

Since graywater from large cruise ships must be treated in all waters subject to this permit, a large cruise ship can no longer legally discharge untreated graywater (see discussion above in 7.1.1 for why EPA made changes to the operational discharge limits for Cruise Ships). However, if a large cruise ship discharges untreated graywater, the vessel owner/operator must keep records estimating all discharges of untreated graywater into waters subject to the permit, including date, location, and volume discharged. This constitutes a permit violation and it must be recorded in the vessel's Annual Report. In order to streamline recordkeeping and reporting requirements, this information may be kept in the sewage and graywater discharge record book otherwise required by 33 CFR §159.315 for those vessels that keep these records. Alternatively, cruise ship operators could record these data in the ship's log or other recordkeeping documentation, as long as the location of the information is clearly known and can be made available to EPA or any EPA representative immediately on request. EPA may use this information, in part, to monitor compliance with and effectiveness of the permit requirements.

7.1.2.2 Treated Graywater

Prior to entering domestic territorial seas, or within 90 days of obtaining permit coverage, whichever is later, cruise ship operators are required to demonstrate that the vessel has the ability to treat graywater to the applicable standards found in Part 5.1.1.1.2 if the vessel will be discharging graywater within 3 nm of shore or into nutrient impaired waters subject to this permit. These data must be reported to EPA consistent with the requirements discussed below.

The 2013 VGP also requires large cruise ships to monitor for several additional parameters: several nutrients and *E. coli*. EPA is requiring monitoring of nutrients to better characterize the effluent from these vessels. Since large cruise ships are already monitoring for other parameters, they will only need to collect extra water for these additional parameters. Hence, there is marginal incremental cost. Many new EPA permits have established pathogen limits for *E. coli* instead of fecal coliform. EPA has left the requirement for fecal coliform to be consistent with Title XIV; however, the Agency believes that it is appropriate to gather *E. coli* concentrations from these vessels to better characterize the effluent.

Furthermore, the permit requires the owner/operator to maintain records estimating the volume of all discharges of treated graywater into waters subject to the permit. These records would consist of the date, location, and volume discharged and could be maintained as part of the sewage and graywater discharge record book required under 33 CFR §159.315.

7.1.2.3 Initial Monitoring

Within 90 days of obtaining permit coverage, large cruise ship operators are required to demonstrate that the vessel has the ability to treat graywater to the applicable standards if the ship will be discharging graywater within 3 nm of shore. Cruise ship operators are required to initially demonstrate the effectiveness of the graywater treatment system by taking at least five (5) samples over 30 days. Samples are required to meet standards for BOD_5, fecal coliform, suspended solids, pH, and total residual chlorine. The requirement for five initial samples is consistent with the Title XIV requirements for large cruise ships operating in Alaska. The permit requires records of monitoring information be kept, including the date, exact place noted in latitude and longitude, and time of sampling or measurements; the individual(s) who performed the sampling or measurements; the date(s) analyses were performed; the individual(s) who performed the analyses; the analytical techniques or methods used; and the results of such analyses. The permit requires records be kept for 3 years.

Additionally, in order for EPA to better understand the performance of AWTSs and to better characterize cruise ship discharges, EPA has included monitoring requirements for *E. coli*, total phosphorus (TP), ammonia, nitrate/nitrite, and Total Kjeldahl Nitrogen (TKN). These tests are not expensive; samples can be taken at the same time as the sampling for which effluent limits have been established, and the information will be helpful for EPA and others to establish the potential environmental impact (if any) of treated Cruise Ship discharges. Such information might be useful for future permit iterations: for instance, EPA could examine whether the prohibition of treated cruise ship effluent in nutrient impaired waters is necessary if systems are removing substantial nutrient concentrations.

For chlorine monitoring, analytical results that are below the method detection limit are considered in compliance with the permit effluent limits, as long as the testing method used had a detection limit no higher than 10 μg/l under ideal conditions. EPA has found that method SM4500-CL G (DPD Colorimetric Method) is able to reach 10 μg/l under ideal conditions. SM4500-Cl G is typically the method that ADEC/USCG uses for compliance monitoring.

In addition, testing and reporting for total residual chlorine is not required if chlorine is not used as the disinfectant in the wastewater treatment process and no water to which chlorine has been added (swimming pools, spas, etc.) is drained to the graywater system.

7.1.2.4 Maintenance Monitoring

After initially demonstrating the effectiveness of the treatment system, operators must conduct the same sampling and testing at least once per quarter to show continued effectiveness of the system and compliance with the permit. This requirement includes keeping all required records of the sampling and testing results for at least 3 years.

Based on public comments, EPA has clarified in the permit that sampling and testing need only be conducted once per quarter for any quarter the vessel discharges graywater into waters subject to this permit. The purpose of this requirement is to ensure that the treatment systems are working properly; however, EPA recognizes that some vessels only discharge periodically or once per year.

7.1.2.5 Treated Pool and Spa Discharges (5.1.2.3)

Vessel owner/operators must monitor chlorine or bromine (as total residual oxidant) concentrations (as applicable) in pool and spa water before discharging such water into waters subject to this permit. Such monitoring for chlorine must use Part 136 methods in order to ensure the dechlorination process is complete. Such monitoring for bromine must use Part 136 methods or may also use colorimetric methods, including with test kits, (for pool and spa discharges only), provided that test kit has method detection limit no higher than 50 μg/L. In addition, vessel records must include the location, estimated volume, and concentration of chlorine or bromine in the discharge.

As with monitoring for chlorine in graywater, analytical results that are below the method detection limit are considered in compliance with the permit effluent limits, as long as the testing method used had a detection limit no higher than 10 μg/l under ideal conditions. EPA has found that method SM4500-CL G (DPD Colorimetric Method) is able to reach 10 μg/l under ideal conditions and so meets these requirements. SM4500-Cl G is typically the method that ADEC/USCG uses for compliance monitoring. For bromine, analytical results below the method detection limit shall be deemed compliant with the effluent limits, provided the permittee uses a testing method with a detection limit no higher than 50.0 μg/L.

7.1.2.6 Monitoring Reporting

In addition to the other reporting requirements established by this permit, vessel operators must submit the initial sampling and testing information to EPA. Once an electronic reporting system is established, it will be available at www.epa.gov/npdes/vessels/enoi. You may check www.epa.gov/npdes/vessels to determine whether electronic reporting for the relevant document has been implemented. If the website indicates that electronic reporting for the document has not been implemented, you do not need to seek the waiver. Maintenance sampling and testing information must be submitted at least once a year.

EPA notes, that unlike the 2008 VGP, monitoring data must be reported directly to EPA. This is to ensure that EPA can review whether all cruise ship data collected are complete and allows cruise ship operators to consolidate all of the reporting requirements into one annual report.

7.1.2.7 Reserved Authority

Meeting the monitoring requirements would not shield the vessel operator from liability if EPA or Coast Guard tests the graywater discharge and finds it is not in compliance with the treatment standards. Non-compliance with any effluent limit would be a violation of the permit.

7.1.3 Education and Training Requirements (Part 5.1.3)

Pursuant to CWA section 402(a)(2), and 40 CFR 122.43(a), and other implementing regulations, EPA is imposing the following education and training requirements.

Crew training is extremely important because the vessel's crew plays a significant role in increasing or decreasing the volume and quality of vessel discharges. The permit requires the cruise ship owner/operator to train the crew members who actively take part in the management of a discharge, or who may affect a discharge, in environmental procedures sufficiently so that the crew could demonstrate proficiency in implementing the procedures; provide advanced training in environmental management procedures to any crew members directly involved in the management of a specific discharge, such that the crew could demonstrate proficiency in implementing the procedures; and establish and enforce sufficient reprimand procedures for any crew member whose actions lead to a violation of any of the effluent limits in this permit, or a violation of other procedures established by the cruise ship operator to minimize the discharge of pollutants.

In addition, the permit requires the cruise ship operator to educate passengers about potential environmental impacts and steps the passengers can take to minimize those impacts. Proper education of crew and passengers plays an important role in meeting environmental protection goals because they are often in the best position to minimize vessel discharges. Graywater is one example. Passengers can minimize the amount of graywater produced onboard if they are made aware of water conservation practices such as reusing sheets and towels. Passengers can control the constituents added to graywater discharge, such as through proper disposal of unused pharmaceuticals which would prevent their ultimate introduction into the aquatic environment. The permit allows flexibility in how these goals are accomplished, and allows the passenger education to take place via posting or distribution of signage, flyers, or other handouts, incorporating environmental information into passenger orientation presentations, holding lectures or seminars, or making announcements over the ship's public address system.

Most cruise ship operators have already incorporated environmental training into established training and education requirements. Some of these education requirements included in the permit are based in part on industry literature created by the industry trade group Cruise Lines International Association (CLIA). The steps required by the permit are already being employed by many cruise ship operators in the industry and thus are available as well as economically practicable and achievable. Inclusion of education requirements in the permit is designed to elevate the standard of conduct to the level of the most responsible operators. Most cruise ship operators are already meeting the permit requirements. For more information on cruise ship operators voluntary actions, please see CLIA 2006.

7.2. MEDIUM CRUISE SHIPS [PART 5.2]

Medium cruise ships are those ships authorized to carry 100 to 499 passengers for hire and provide overnight accommodation to those passengers. EPA selected a threshold of 100 people as the lower end of the range to capture vessels where the volume of graywater generated gradually increases. The discharges of untreated graywater from cruise ships in this size range has been shown to contain similar pollutants to those in untreated graywater discharges from large cruise ships (ADEC, 2002). Therefore, these discharges also have a similar negative impact on water quality. As discussed above, cruise ships have unique characteristics that require additional discharge management requirements. While medium cruise ships carry fewer passengers than large cruise ships, the volume of graywater generated is still significantly higher than that generated by a cargo ship carrying crew only. See Part 7.1 for additional discussion on the nature of cruise ship discharges, the reason effluent limits were established, and how these limits represent BPT/BAT.

EPA has made changes from the proposed 2013 VGP to the final 2013 VGP for requirements for medium cruise ships. In the proposed VGP, EPA would have altered the applicability for existing medium-sized cruise ships (i.e., constructed before issuance of the 2008 VGP) that had to meet the numeric treatment limits. EPA had proposed changing the applicability threshold from a vessel unable to voyage more than 1 nm from shore to a vessel unable to voyage more than 3 nm from shore. EPA was persuaded by the comments received not to make the proposed change in the final VGP. The final VGP retains the applicability threshold that is consistent with the 2008 VGP for medium Cruise Ships. EPA did not intend to inadvertently require retrofits for a vessel that is able to voyage more than 1nm from shore, but not 3 nm from shore. Based on the previous permit conditions in the 2008 permit, some existing (constructed before issuance of the 2008 VGP) medium-sized vessels may have foregone installation of graywater treatment during regularly scheduled vessel maintenance and repair since issuance of the 2008 VGP based on the 2008 VGP provisions that had authorized the discharge untreated graywater while underway.

Like in the 2008 VGP, today's final permit continues to identify who must meet numeric graywater treatment limits as "vessels unable to voyage more than 1 nm from shore and [that] were constructed before December 19, 2008." As discussed above, retains this applicability term in recognition that there may be medium cruise ships built before December 19, 2008 (the day after the issuance date of the first VGP) that could voyage more than one nm from shore, but not voyage three nm from shore. The provision has been retained for clarity and so as not to inadvertently require an existing medium sized cruise vessel (built prior to the issuance of the first VGP) to retrofit to a graywater treatment system if the vessel had no other management options.

There may be rare cases where some medium sized cruise vessels constructed on or after December 19, 2008 are unable to install graywater treatment systems or to use other management options to meet the numeric treatment limits in Part 5.2.1.1.2 of the permit. These cases may include when an existing cruise vessel (originally built before the issuance of the first VGP) undergoes a major conversion, but re-plumbing the graywater infrastructure within the vessel to a centralized collection and treatment point may not be feasible. Other examples could include medium cruise ships that were inadvertently designed and constructed during the first term of the VGP in such a unique manner as to render the installation of graywater treatment systems on-board impossible. In these cases, the medium sized cruise ship owner/operator may apply for an individual permit for graywater discharges on the basis that specific technology based limits for that vessel should be developed. EPA has determined, however, based on available data and in the absence of compelling vessel-specific data indicating otherwise, that the treatment-based limits in today's VGP represent BAT for all new build medium cruise ships. Any request for an individual permit would need to include data and information demonstrating why these requirements are not BAT for that particular vessel.

7.2.1 Graywater Management

As in the 2008 VGP, vessels newly built after December 19, 2008 must meet the limits found in Part 5.2 of the VGP. EPA established the numeric effluent limits for graywater found in Part 5.2.1.1.2 of the VGP because data gathered by EPA demonstrate that technologies are available, as well as economically practicable and achievable, and therefore, would represent BPT and BAT levels of control (see additional discussion below). The treatment technologies that remove non-conventional pollutants also treat conventional pollutants; hence, EPA applied the BAT standard to all pollutants for which the permit establishes standards for graywater. For additional discussion of BAT, BCT, and the requirements of each, see sections 4.1 and 4.2 of this fact sheet.

7.2.2 Differences Between the Requirements for Large Cruise Ships and Medium Cruise Ships

The permit requirements for medium cruise ships are identical to those for large cruise ships, with two exceptions. These are:

- An additional option for discharging while operating in Nutrient Impaired Estuaries.
- Differences for existing medium cruise ships (built before December 19, 2008) unable to voyage more than 1 nm from shore.

7.2.2.1 Different Requirements in Nutrient Impaired Waters

In nutrient impaired waters such as estuaries, this permit allows for medium sized cruise ships unable to retain graywater on board to discharge untreated graywater while moving at a speed of at least 6 knots. This difference was included because, at this time, EPA expects fewer of these size vessels to have treatment capacity to meet the more stringent standards in Part 5.2.1.1.2. Hence, owner/operators may not be able to adjust their fleet positions to assure that vessels are available that have either sufficient holding capacity or the ability to treat to the standards in Part 5.2.1.1.2 of the permit to meet the nutrient impaired estuary requirements. Though EPA fully expects most medium cruise ships to have the ability to hold the graywater until they get further than 3 nm offshore (for example, medium cruise ships sailing in Glacier Bay in Southeast Alaska hold their wastewater and do not discharge for the duration of their visit in the park), it may be difficult to hold the graywater for prolonged periods in large nutrient impaired estuaries (in which the channel can be more than 3 nm from any shore). Though treatment technologies to meet the standards in part 5.2.1.1.2 are available, EPA has not concluded that requiring all medium cruise ship owner/operators to install these systems prior to coverage under this permit is economically achievable. This extra flexibility for medium cruise ships allows owner/operators to comply with the requirements of the permit, while offering a more environmentally protective approach than allowing the discharge of graywater into nutrient-impaired estuaries while stationary. Hence, these requirements, taken as a whole, are technologically available and economically practicable and achievable.

7.2.2.2 Differences for Existing Medium Cruise Ships Built Before December 19, 2008 Unable to Voyage More than 1 nm from Shore

Some older, existing medium cruise ships that operate on rivers or lakes, are not authorized to go beyond 1 nm (e.g., are restricted by their operational certificate to operating only within 1nm of shore), or otherwise never go beyond 1 nm from shore. A Medium Cruise Ship in operation as of December 19, 2008 is not required to meet the graywater requirements found in Part 5.2.1.1.1 if the ship is unable to voyage 1 nm from shore, unless the ship undergoes a major conversion subsequent to the VGP effective date. Vessels constructed on or after December 19, 2008 are required to meet the graywater standards found in Part 5.2.1.1.1. (the same as large cruise ships). If, during the permit term, a vessel that is in operation on the effective date of this permit undergoes a major conversion as defined in Part 7 of the permit, the discharge from such a ship must meet the treatment standards found in Part 5.2.1.1.1 of the permit.

Unlike large cruise ships, which by their operational necessities are ocean going, some medium cruise ships are unable to regularly voyage 1 nm from shore. If onshore treatment is not readily available in river port towns for treatment of graywater, then the ship would be unable to meet these graywater treatment standards immediately. Furthermore, installation of AWTSs may be more complicated on older vessels than on newer vessels. Hence, based on the comments submitted and further economic analysis (included in the economic analysis for this permit) and unlike with larger cruise ships, many medium cruise ships may not be able to immediately achieve these treatment standards without installation of equipment that could require a major overhaul of the vessel. This type of vessel repair or conversion could be extensive, require dry-docking, and in some cases, re-design of major structural components of the vessel. For these reasons, EPA determines that it is not economically practicable or achievable to require all existing medium cruise ships which are unable to travel outside 3 nm to meet the requirements of Part 5.2.1.1.1 at this time. However, EPA notes that it may yet become economically achievable to include this requirement for all medium cruise ships in future iterations of this permit and owner/operators are so advised should they upgrade existing graywater vessel treatment capacity. For additional information on economic achievability and BAT, please see the economic analysis for this permit.

7.3. Large Ferries (Part 5.3)

Ferries are vessels for hire that are designed to carry passengers and/or vehicles between two ports, usually in inland, coastal, or nearshore waters. They usually travel the same route several times a day and do not provide overnight accommodations to their passengers. They have discharges unique to their industry because of the potentially high volume of both pedestrian and vehicular traffic that they carry, usually on inland or coastal waters. These waters usually carry a relatively high volume of vessel traffic and also can contain highly valuable and ecologically sensitive mating and nesting grounds for birds, fish, and mammals. The permit provisions apply to large ferries. For purposes of the permit, large ferries are those ferries authorized to carry a) more than 100 tons of cars, trucks, trains, or other land-based transportation or b) 250 or more people.

EPA could not find a preexisting definition of large ferry. Hence, the Agency reviewed the number of ferries captured at different weight thresholds using data including all steel hulled, self-propelled vessels classified by the WTLUS/VESDOC as Passenger Vessels, Combination Passenger/Cargo ships, and by Ferries Data DOC as Passenger Vessels, Combination Passenger/Cargo ships, and Ferries. EPA considered the relative increase in the discharge of pollutants, particularly those pollutants generated from land-based transportation on board vessels, as ferry size increased when establishing this threshold. For this permit, EPA has stated that a “Large Ferry” means a “ferry” that: a) has a capacity greater than or equal to 100 tons of cargo, e.g., for cars, trucks, trains, or other land-based transportation or b) is authorized by the Coast Guard to carry 250 or more people.

In order to minimize the harmful effects of discharges from large ferries, this permit imposes specific requirements with respect to the potential spills, drips, and leaks associated with carrying of vehicles. These requirements include treatment of runoff from below deck (e.g. areas not exposed to the elements) parking and storage areas with an oily water separator or other similar device, and require that this discharge not be released into waters listed in Part 12.1. In addition, pursuant to CWA sections 402(a)(2), and 40 CFR 122.43(a), and other implementing regulations, the permit sets out requirements for all large ferries with respect to educating the crew and passengers about environmental procedures. It is the crew that will implement the environmental requirements found in the permit, and because of that, they must be taught what to do, how to do it, and why they are doing it. Large ferry owner/operators also are required to educate passengers on their potential environmental impacts and how those can be mitigated. This education must address eliminating the discharge of trash into any waste stream, minimizing the production of trash from parking areas and storage areas, eliminating the addition of unused soaps, detergents and pharmaceuticals to the graywater or blackwater systems, and minimizing the production of graywater. There are many ways that a ferry operator can accomplish passenger education, including posted signage, distribution of informational materials, incorporating environmental material in orientation presentations, and broadcasting environmental information over loudspeakers or the public address system.

Some of these education requirements included in the permit are based in part on industry literature created by the industry trade group CLIA. EPA anticipates that educating crew and passengers on cruise ships is similar to educating the crew and passengers of large ferries. The educational requirements in the permit are already being employed by many cruise ship owner/operators in the industry.

For those large ferries which are authorized by the Coast Guard to carry 250 or more people, the permit also requires use of shoreside graywater reception facilities if they are reasonably available. If not available, such large ferries are required to hold their graywater while in port if the vessel has the holding capacity and to discharge the effluent while the vessel is underway under the operational conditions set out in section 5.3.1.2 of the permit.

The technologies upon which the permit's graywater requirements are based are technologically available and economically practicable and achievable. These requirements are intended to reduce the volume of graywater discharged while large ferries are pierside so as to reduce the discharge of chemicals, nutrients, and pathogens into marinas and ports, which can be located in ecologically sensitive estuaries, and where large numbers of vessels may be discharging in close proximity. The cumulative impact of numerous graywater discharges in port may be significant. In addition, these requirements will help reduce potential impacts if graywater needs to be discharged while underway by setting out operational limits on such discharges, as further explained in the Fact Sheet discussions for graywater from cruise ships.

Unlike the 2008 VGP, this permit does not authorize the discharge of coal ash slurry from coal fired propulsion systems from ferries. The previous VGP suspended the authorization for these discharges in December 2012. Either coal ash discharges must cease into waters subject to this permit or they must be authorized under an individual NPDES permit.

7.4. Barges (Including Hopper Barges, Chemical Barges, Fuel Barges, Crane Barges, Dry Bulk Cargo Barges) (Part 5.4)

Barges are large flat-bottomed boats typically used to move cargo in inland waterways. Barges are usually not powered vessels, but are instead pushed or pulled by tugboats. Due to the way they carry cargo, the permit imposes additional measures in order to prevent and minimize the discharge of pollutants from barges. Specifically, the permit requires additional measures to prevent the contamination of condensation with oily or toxic materials. Based on information provided in comments received in response to the June 21, 2007 Federal Register notice, it is a technologically available and economically achievable and practicable practice for barge owner/operators to prevent the contamination of condensation. This permit also prohibits any discharge that has or causes a visible sheen or is otherwise discharged in a quantity that may be harmful.

The permit also requires barges to conduct an inspection not required for other vessels. Every time water is pumped from any area below deck, the vessel operator must conduct a visual sheen test by conducting a visual inspection of the discharge and the water around the barge to check the water for a visual sheen. EPA is imposing this requirement due to our understanding that this is current good marine practice and that pumping water from below deck (where water may have come into contact with cargoes) is more likely to result in a discharge that may be harmful. Under 40 CFR 110 or 40 CFR 302, if a visible sheen is detected, you must report the discharge immediately to the National Response Center at 1-800-424-8802 or on the Center's website at www.nrc.uscg.mil. Furthermore, appropriate corrective actions must be taken according to the corrective actions section in Part 3 of the permit and the event must be recorded according to Part 4.2 of the permit.

Today's VGP improves efficiency for many unmanned, unpowered barges. This includes reducing the recordkeeping requirements found under Part 4.2 of the Permit, allowing electronic recordkeeping, reducing requirements for routine visual inspections when a vessel is "fleeted", and allowing vessel owner/operators to submit combined annual reports for certain vessels. EPA believes that some of these changes should significantly improve efficiency for most vessel owner/operators, but several will result in particular efficiencies for the barge industry.

7.5. Oil and Petroleum Tankers (Part 5.5)

Oil tankers are designed to carry oil and other petroleum products in bulk tanks. Due to the cargo they carry and how they carry their cargo, they are prone to environmentally harmful discharges of oil, particularly during cargo loading and unloading operations. To mitigate these risks, the permit requires that scuppers be blocked during cargo operations to prevent oil from contaminating discharges authorized by this permit. Any oil that is spilled must be cleaned up with oil absorbent cloths or other device to minimize contamination of any authorized discharge. The discharges of water from deck seals are authorized when such deck seals are installed as an integral part of an inert gas scrubber system. These requirements represent existing good marine practice for these vessels.

A visual sheen test must be conducted after cargo loading operations, cargo unloading operations, and deck washing. The visual sheen test detects the presence of free oil on the surface of the water surrounding the vessel. That free oil is visible on the water's surface as an oily sheen. Under 40 CFR 110 or 40 CFR 302, if a visible sheen is detected, you must report the discharge immediately to the National Response Center at 1-800-424-8802 or on the Center's website at www.nrc.uscg.mil. Furthermore, appropriate corrective actions must be taken according to the corrective actions section in Part 3 of the permit and the event must be recorded according to Part 4.2 of the permit.

Oil spill management measures are carried out by the tanker's crew. Pursuant to CWA sections 402(a)(2), and 40 CFR 122.43(a), and implementing regulations, EPA is requiring that all crew members who actively take part in management of a discharge or who may affect a discharge receive training so they are aware of what they must do, when to do it, and why to do it in order to minimize the discharge of oil and other toxic pollutants. In addition, reprimand procedures must in place to hold crew accountable for any failure to follow established pollution prevention procedures.

7.6. Research Vessels (Part 5.6)

Research vessels are those that are engaged in investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted scientific theories or laws in the light of new facts, or practical application of such new or revised theories or laws. They typically include State, Federal, non-profit, educational, and occasionally corporate vessels conducting scientific research and experiments. They are not engaged in commercial activity that results in the direct production of or harvesting for sale of mineral or living resources collected during their voyages. This permit lists the following materials that research vessels are authorized to discharge: tracers (dyes, fluorescent beads, SF6), drifters, tracking devices and the like, and expendable bathythermograph (XBT) probes. The permit's provisions limit these discharges to the minimal amount that is necessary to conduct the research. In addition, these discharges are only authorized for the sole purpose of conducting research on the aquatic environment or its natural resources in accordance with generally recognized scientific methods, principles, or techniques. EPA expects research vessels to employ responsible research practices at all times. EPA believes that these practices allow for productive research while minimizing the discharge of materials, and that they are technologically available and economically practicable and achievable.

7.7. Emergency Vessels (Part 5.7)

Emergency vessels include firefighting boats, police boats, and other boats with a public safety mission. These vessels have supplemental permit provisions in Part 5.7 of this permit that specifically allow discharges incidental to their public safety responsibilities. The permit allows the discharge of substances necessary for securing and saving lives at sea. In addition, it allows discharges for training, testing and maintenance purposes, as long as those discharges comply with any additional requirements of the CWA, including section 311, which imposes conditions on the discharge of oil. Furthermore, when these discharges include the use of foaming agents for oil or chemical fire response, they must be in accordance with the National Contingency Plan, pursuant to 40 CFR 300. The National Contingency Plan contains procedures for preparing for and responding to discharges of oil and hazardous substances.

EPA notes that the most commonly used aquatic firefighting substance, AFFF, has the potential for significant environmental impact. In addition to requirements of Part 2.2.5 of this permit, EPA encourages operators of emergency and fire boats to use AFFF formulations that contain low concentrations of perfluorinated surfactants or contain non-fluorinated surfactants that maintain emergency operations effectiveness. Use of alternative formulations of AFFF is strongly recommended for those vessels that operate in areas near active commercial or recreational fisheries, near swimmable waters, or in high traffic areas. EPA encourages emergency vessel owner/operators to use common sense to minimize unnecessary discharges of these toxic firefighting substances. Furthermore, EPA encourages emergency vessel owner/operators to use less persistent (non-fluorinated) substitute foam for training purposes.

8. STATE OR TRIBAL REQUIREMENTS (PART 6)

Part 6 of the final VGP identifies provisions provided to EPA by States and Tribes in their CWA § 401 certifications that the States and Tribes deemed necessary to assure compliance with applicable provisions of the CWA and any other appropriate requirements of State and Tribal law. See 33 U.S.C. 1341(d); 40 CFR § 124.53(e)(1). Pursuant to CWA § 401(d), EPA has attached those State and Tribal provisions to the final VGP; those that constitute effluent or other limitations or monitoring requirements are enforceable conditions of the federal permit. *American Rivers, Inc. v. FERC*, 129 F.3d 99, 107 (2nd Cir. 1997). These conditions are subject to review in State and Tribal administrative and judicial tribunals with appropriate jurisdiction. 40 CFR § 124.55(e); *American Rivers, Inc. v. FERC*, 129 F.3d 99, 102 (2nd Cir. 1997); *Roosevelt Campobello Int'l Park Comm'n v. EPA*, 684 F.2d 1041, 1056 (1st Cir. 1982). Part 6 of the permit also includes conditions provided by states as part of their concurrence with this permit for CZMA purposes if applicable (see Part 12.1 of this fact sheet).

9. DEFINITIONS (APPENDIX A)

Appendix A of the Permit provides permit-specific definitions of statutory, regulatory, and other terms important for understanding this permit and its requirements. Any terms that are not listed in this definitions section have the meaning given to the terms by 40 CFR Part 122.2 (the definitions section of the NPDES regulations). To develop these definitions, EPA has, where possible, relied on existing definitions in other laws and regulations applicable to this universe of permittees in order to provide consistency with those laws and provide permittees with a familiar framework. For those definitions that were developed based on another source, the citation to that law or regulation is included in brackets after the definition.

EPA has added several new definitions to this permit, including "biodegradable," "active substances,""”alternative management systems," "environmental acceptable lubricants," "fish hold," "Lakers," "niche areas," "seafood processing," "untreated graywater," and "voyage." Based on public comment received, EPA has modified definitions including biodegradable and bioaccumulative.

10. NOTICE OF INTENT AND NOTICE OF TERMINATION (APPENDIX E AND F)

Appendix E of the permit gives those owners and operators who will be required to submit an NOI form an explanation of the process and requirements. This Part reiterates who must file an NOI, pursuant to 1.5.1 of this permit ("How to Obtain Authorization"), and includes a table that outlines the deadlines for submission of an NOI, and corresponding discharge authorization dates. This table provides the same information as Table 1 of this permit. In addition, Part 10.2 provides the actual NOI form, and gives section-by-section instructions on how to fill out the form. The website address for submitting the NOI form is www.epa.gov/npdes/vessels eNOI. The NOI form for vessel discharges will be available on the website approximately 6 months after permit issuance.

Appendix F of the permit discusses how and when to terminate permit coverage using a Notice of Termination (NOT) form, pursuant to the permit's requirements in 1.6. Like the NOI form in Part 10, Part 11 provides the web address for submission of the NOT form, a section-by-section explanation about each section of the NOT form, and the actual NOT form.

11. WATERS FEDERALLY PROTECTED WHOLLY OR IN PART FOR CONSERVATION PURPOSES [APPENDIX G]

Appendix G (formally referred to as Part 12 waters in the 2008 VGP) of this permit lists "waters federally protected in whole or in part for conservation purposes," and several of the permit's technology-based effluent limits prohibit or limit various discharges in these waters to the extent they are within waters subject to this permit. As discussed in section 4.2.3 of this fact sheet, EPA has found that the prescribed limits are technologically available and economically practicable and achievable for certain discharges. Because it is possible to limit discharges to certain times, but not to limit those discharges indefinitely, EPA focused on imposing these limitations for waters federally protected in whole or in part for conservation purposes. To develop this list of waters, EPA reviewed several federal authorities that protect waters that are known to be of particular high value or sensitive to environmental impacts. These waters are comprised of areas that are important to EPA, our federal partners, and the public at large, as evidenced by the waters' special status or designation by the Federal government as National Marine Sanctuaries, Marine National Monuments, National Parks, National Wildlife Refuges, National Wilderness Areas, or parts of the National Wild and Scenic Rivers System. As mentioned, these waters are likely to be of high quality and consist of unique ecosystems which may include distinctive species of aquatic animals and plants. Furthermore, as protected areas, these waters are more likely to have a greater abundance of sensitive species of plants and animals that may have trouble surviving in areas with greater anthropogenic impact.

12. OTHER LEGAL REQUIREMENTS

12.1. COASTAL ZONE MANAGEMENT ACT (CZMA)

The Coastal Zone Management Act (CZMA) and its implementing regulations (15 CFR Part 930) require that any Federal agency activity or Federally licensed or permitted activity occurring within (or outside but affecting) the coastal zone) of a state with an approved coastal zone management program (CZMP) be consistent with the enforceable policies of that approved program to the maximum extent practicable. Agency general permits that do not involve case-by-case or individualized determinations by the Agency are federal activities for the purposes of CZMA section 307(c)(1). Following proposal of the VGP, EPA provided the relevant state coastal zone management agencies with EPA's national consistency determination regarding the enforceable policies in approved state CZM programs for the coastal zones including state waters where the VGP would authorize discharges. 15 CFR 930.31(d). Consistent with the maximum extent practicable standard in 15 CFR 930.32, the final VGP either incorporates state conditions (see VGP Part 6), or if not incorporated or if a state coastal zone management agency objected to the VGP, Part 6 of the VGP notifies potential users of the permit that the VGP is not available for use in that State unless vessel owner/operators wanting to use the VGP in that State provide the State agency with an individual consistency certification under 15 CFR Part 930 subpart D and the State agency concurs.

12.2. ENDANGERED SPECIES CONSULTATION

Section 7(a)(2) of the Endangered Species Act (ESA) requires each Federal agency, in consultation with and with the assistance of the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), collectively "the Services," to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species (referred to as "listed species") or result in the destruction or adverse modification of their designated critical habitats.

The Services have published regulations implementing ESA section 7 at 50 CFR Part 402. The regulations provide that a Federal agency (such as EPA) must consult with FWS, NMFS, or both if the agency determines that an activity authorized, funded, or carried out by the agency may affect listed species or critical habitat. The kinds of effects that trigger the consultation obligation could include, among other things, beneficial, detrimental, direct and indirect effects. EPA commenced informal consultation with the Services in December 2011. Informal consultation consisted of briefing the Services' staff on the contents of the draft permits, discussing EPA's proposed outline and methodological approach of a BE for both permits, including using a detailed analysis of expected constituents in and impacts from incidental vessel discharges, representative listed species, and reference action areas to inform the broader effects analysis. EPA also requested species lists, additional pertinent information from the Services, and discussed the permit issuance timeline. As part of informal consultation, EPA met with the Services on multiple occasions, and sought and received valuable input on the design of the Agency's Biological Evaluation (EPA 2012b, Nagle 2012).

EPA initiated formal consultation with the Services on July 3, 2012, submitting a formal consultation package including an extensive biological evaluation for the 2013 VGP and sVGP. Section 7 of the ESA allows 90 days for interagency consultation and an additional 45 days for the Services to prepare a biological opinion, under most circumstances. After a short, mutually agreed upon extension of the formal consultation time frame, EPA and the Services successfully concluded formal consultation on November 28 and 29, 2012 with transmittal of separate biological opinions. Both of those opinions concluded that EPA's issuance of the VGP was not likely to jeopardize listed or proposed species or adversely modify designated or proposed critical habitat. Both biological opinions can be found in the docket for this permit issuance.

Furthermore, on March 23, 2012 the United States Coast Guard published their final ballast water discharge standard in the Federal Register, and subsequently the Services concluded consultation on that action in June 2012. The FWS concluded on June 1, 2012 that the USCG's action was not likely to jeopardize listed or proposed species or adversely modify designated or proposed critical habitat and NFMS followed with a June 20, 2012 biological opinion that the USCG's ballast water discharge standard may affect but is not likely to adversely affect threatened and endangered species or their critical habitat. The Vessel General Permit both requires adherence to the USCG's ballast water discharge standard and contains additional environmental protections from that recently issued rulemaking.

12.3. ESSENTIAL FISH HABITAT CONSULTATION

Pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), Federal agencies must consult with National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH). Upon review, EPA has determined that issuance of this final permit will have no adverse effect on EFH. Any effects of this permit on essential fish habitat would be beneficial by imposing restrictions, including management practices, on discharges incidental to the normal operation of vessels. Since prior to enactment of the CWA and the Magnuson-Stevens Act, such discharges have occurred without restrictions.

12.4. MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

Title I of the Marine Protection, Research and Sanctuaries Act (MPRSA) (also known as the Ocean Dumping Act) generally prohibits, unless authorized by a permit issued under the Act, (1) transportation of material from the US for the purpose of ocean dumping; (2) transportation of material from anywhere for the purpose of ocean dumping by US agencies or US-flagged vessels; and (3) dumping of material transported from outside the US into the US territorial sea or dumping of material transported from outside the US into the US contiguous zone, to the extent that it may affect the territorial sea or the territory of the United States. MPRSA section 101.

Dumping under the MPRSA means "a disposition of material: Provided, that it does not mean a disposition of … a routine discharge of effluent incidental to the propulsion of, or operation of motor-driven equipment on, vessels," nor "a disposition of any effluent from any outfall structure to the extent that such disposition is regulated under the [CWA]." MPRSA 3(f), 33 U.S.C. 1402(f). The VGP regulates such discharges, i.e., routine discharges incidental to the propulsion or normal operation motor-driven equipment on vessels and/or effluent from outfall structures, and thus the regulated discharges are not regulated under the MPRSA.

12.5. OIL SPILL REQUIREMENTS

Section 311 of the CWA prohibits the discharge of hazardous substances in harmful quantities. Discharges incidental to the normal operation of a vessel specifically controlled by the permit are excluded from the provisions of section 311. However, this permit does not preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties for other unauthorized discharges of hazardous substances which are covered by section 311 of the CWA.

12.6. Paperwork Reduction Act

The information collection requirements for the first iteration of the VGP were approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. as part of the NPDES Consolidated ICR. On September 28, 2008 EPA published the first public notice of this ICR under the OMB control number 2040-0004 and on December 17, 2008 EPA published the final public notice for a 30 day comment period.

This information must be collected in order to appropriately administer and enforce the terms and conditions of the VGP. This information collection is mandatory as authorized by Clean Water Act section 308 and all information collected will be treated as Confidential Business Information (CBI).

An agency may not conduct or sponsor, and a person shall not be subject to any penalty for failing to comply with, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR Part 9. When this ICR is approved by OMB, the Agency will publish a technical amendment to 40 CFR Part 9 in the Federal Register to display the OMB control number for the approved information collection requirements contained in this final permit.

12.7. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that these permits will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. The provisions in these permits include, among other things, new requirements for ballast water discharges, other incidental discharges, commercial fishing vessels, and vessels less than 79 feet, which will result in an increase in the level of environmental protection. The requirements in the VGP and sVGP apply equally to discharges from regulated vessels, and therefore do not disproportionately and adversely affect minority or low-income populations.

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