

2013 VGP Sampling & Analysis Requirements

The US Environmental Protection Agency (EPA) 2013 Vessel General Permit (VGP) requires certain vessels to sample and analyze ballast water, bilgewater, graywater and exhaust gas washwater discharges. In waters subject to the VGP, sampling must be conducted each year the discharge occurs. Each discharge has specific sampling and analytical testing requirements, and the analytical results are to be submitted in the vessel's VGP Annual Report.

This publication is to provide information on sampling and analysis requirements and does not address the VGP monitoring requirements tied to the functionality or data recording capabilities of ballast water management systems and exhaust gas scrubbers.

Ballast Water Discharge

All vessels, regardless of build date, that operate a ballast water management system (BWMS) in waters subject to the VGP must collect and analyze treated ballast water samples for selected biological indicator organisms as per VGP section 2.2.3. If the BWMS uses an active substance, additional samples and tests for residual biocides or derivatives, must also be conducted. Please note that samples collected

are small volumes that will assist in assessing the proper operation of the BWMS.

The biological indicator organisms include total heterotrophic bacteria, including *E. coli* and enterococci. For most vessels, treated ballast water samples must be collected and analyzed twice per year. If analytical results are below VGP limits for two consecutive sampling events, monitoring may be reduced to one time per year for subsequent sampling.

The 2013 VGP delineates sampling requirements for BWMS for which high quality data is available or not. Most vessels are required to use USCG Type Approved BWMS or USCG accepted alternative management systems, which are determined to be BWMS having high quality data available. Therefore, this publication focuses on the sampling requirements for these BWMS.

If the BWMS uses a biocide, the EPA has identified a list of residual biocides or derivatives required to be sampled and analyzed in treated ballast water samples. Table 1 lists the analytes for specific biocides and the EPA analytical methods.



Table 1. Biocides and Associated Analytes for VGP Ballast Water Monitoring

Biocide	Analyte	EPA Analytical Method
Alkylamines	Alkylamines	EPA Method 8360B and 8270D
Chlorine or Chlorine Dioxide	Chlorine Dioxide	EPA Method 327.0-1 or SM 4500 ClO ₂ E
	Chlorite/Chlorate	EPA Method 300.1
	Haloacetic Acids	EPA Method 552.2
	Total Residual Oxidizers (TRO) as Cl ₂	SM 4500-Cl G or ISO 7393/2
	Total Trihalomethanes	EPA Method 8260
Ozone	Bromate	EPA Method 300.1, EPA Method 317 or ASTM D 6581-00
	Bromoform	EPA Method 8260
	Haloacetic Acids	EPA Method 552.2
	Total Residual Oxidizers (TRO) as Cl ₂	SM 4500-Cl G or ISO 7393/2
	Total Trihalomethanes	EPA Method 8260
Peracetic Acid	Hydrogen Peroxide	Titimetric analysis (JIS K 1463:2007, EMD Chemicals 2011 or CHEMetrics 2010)
	Peracetic Acid	Photometric analysis (Pinkernell, 1997, EMD Chemicals 2011 or CHEMetrics 2010)
	pH	SM 4500 H+

Bilgewater/Oily Water Separator Discharge

Newbuild vessels, built on or after 19 December 2013, that discharge bilgewater into waters subject to the VGP must sample and analyze discharged bilgewater for oil and grease content as per VGP section 2.2.2. Two methods of analysis are identified in the 2013 VGP, an ISO method and an EPA method. Either method is acceptable for use. However, the EPA method is more commonly offered in the US and also has a longer hold time of 28 days.

For vessels having completed two consecutive years of testing with analytical results less than 5 ppm of oil and grease, subsequent 2013 VGP monitoring sampling is not required if:

- The vessels use an oily water separator capable of achieving 5 ppm oil and grease or use an alarm that prevents the discharge of oil and grease above 5 ppm;
- The oil content monitor (OCM) is calibrated at least annually; and
- The OCM never reads above 5 ppm during discharges in US waters.



Graywater Discharge

The 2013 VGP requires graywater monitoring for newbuild vessels (i.e., built on or after 19 December 2013) with a maximum crew capacity greater or equal to 15 that provides overnight accommodations for the crew or for certain vessels operating in the Great Lakes that are not “commercial” as outlined in VGP section 2.2.15.1. Graywater sampling must occur twice per year, at least 14 days apart and should be taken during normal operation of the system. Table 2 identifies the analytes and analytical methods for graywater samples.

Table 2. Required Graywater Discharge Analytes and Analytical Methods

Analyte	Analytical Method
Biological Oxygen Demand (BOD)	Standard Method SM 5210 B
Fecal Coliform or <i>E. coli</i>	Standard Method SM 9222D or SM 9221E or EPA Method 1103.1 and 1603, Standard Method SM 9223B, ASTM D5392 – 93, ISO 9308-1:2000, or Colilert®
Total Suspended Solids	Standard Method SM 2540D
pH	Standard Method SM 4500-H B
Total Residual Chlorine	Standard Method SM 4500-Cl G

Samples for fecal coliform or *E. coli* may be analyzed only once per year if vessels are having difficulty analyzing within the recommended hold times.

Exhaust Gas Scrubber Washwater Discharge

The 2013 VGP requires sampling and analytical monitoring of exhaust gas scrubber washwater discharges for all vessels using exhaust gas scrubbers that discharge into waters subject to the VGP section 2.2.26. These requirements do not apply to inert gas (IG) scrubbers nor do they apply to exhaust gas scrubbers with closed loop systems that do not discharge overboard.

Samples are to be collected from the inlet water, water after the scrubber (but before any treatment), and the discharge water. Table 3 lists the required analysis and analytical methods for exhaust gas scrubber discharges. Two samples are to be collected and analyzed in the first year of permit coverage or system operation, whichever is first. One sample may be collected as part of the system installation and one sample may be collected as part of the vessel’s survey. During subsequent years of operation, samples must be collected and analyzed at least once per year.

Table 3. Required Exhaust Gas Scrubber Discharge Analytes and Analytical Methods

Analysis	Method
Dissolved and Total Metals	EPA Method EPA-200.8 or EPA-200.9
PAHs	EPA Method EPA-550.1, EPA-610, EPA-625, EPA-8100, EPA-8270c or EPA-8310
Nitrate/Nitrite	EPA Method EPA-353.2
pH	Standard Method SM 4500-H B



Sample Collection & Documentation

When collecting samples, vessels must be aware of the sample collection requirements (i.e., specified bottles, hold times) and necessary documentation for sampling. Most analytical methods specify the required bottle types and allowable sample hold times (i.e., maximum time between the sample collection/preservation and analysis for results to be determined valid). For example, fecal coliform has one of the shortest hold times at eight hours. Vessels must make all attempts to ensure samples are analyzed within the reported hold times.

Prior to sending samples to a laboratory, each sample must be sealed to prevent tampering and be accompanied by a Chain of Custody form. The Chain of Custody form identifies each person involved in the handling and transport of the sample. Laboratories will provide further guidance and specific sample requirements.

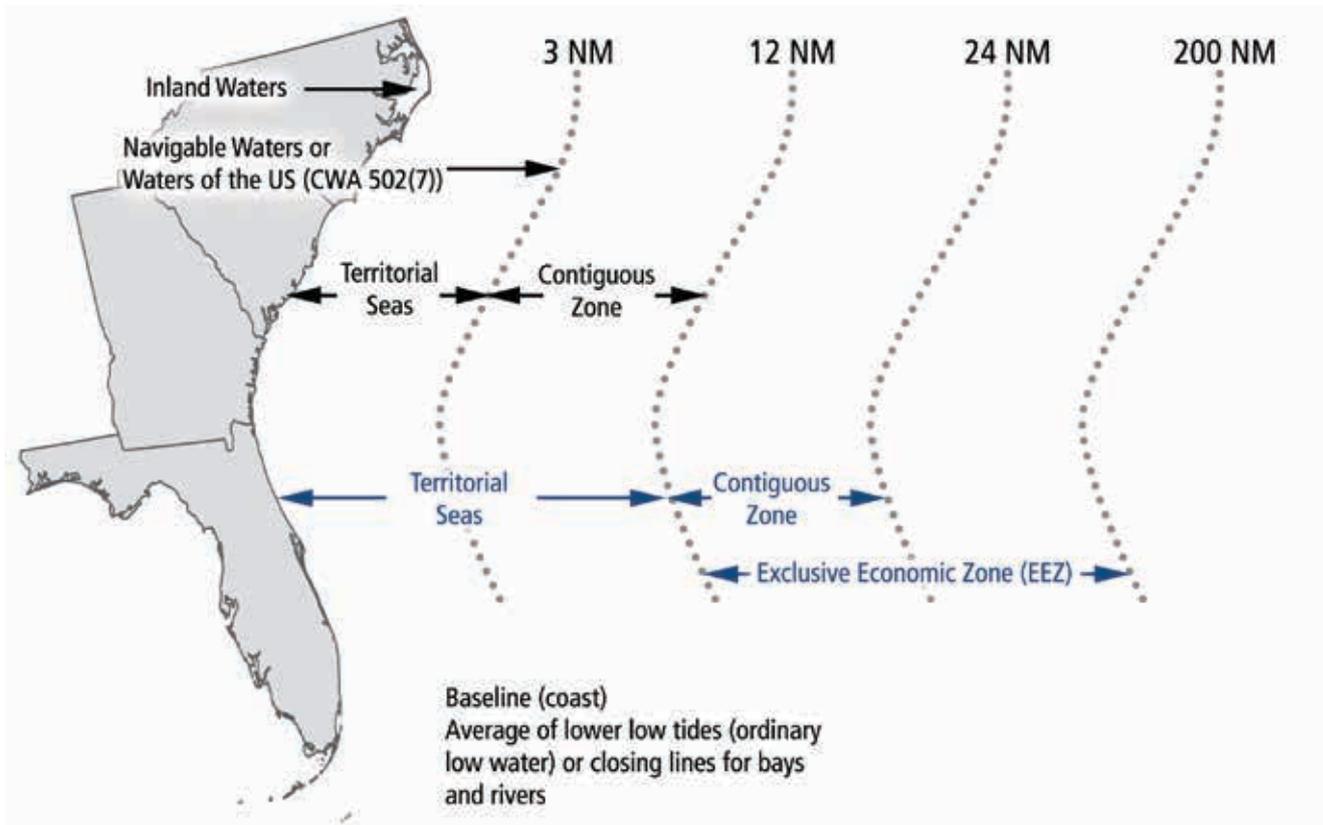


Figure 1. US Maritime Borders

To ensure compliance with VGP requirements, records of monitoring information shall include:

- The date, exact place, time, and location(s) of sample collection;
- Names of individual(s) who performed the sampling;
- Date(s) analyses were performed;
- Names of laboratory and individual(s) who performed the analyses;
- Analytical techniques or methods used;
- Results of such analyses; and
- If the sample is a mixture of discharges due to system design, the proportions of wastestreams (such as mixed graywater and blackwater) are to be provided.

The vessel's Annual Report must include all monitoring information and laboratory results. Records must be maintained on board the vessel for a minimum of three years. If a vessel does not discharge a VGP-specified discharge into waters subject to the VGP, no sampling of that discharge is required and the vessel's Annual Report should clearly indicate that no discharge occurred during the year of permit coverage.

Laboratories

Identifying experienced, local laboratories is one of the most important steps to ensure successful sampling. A laboratory may be located inside or outside the US as long as a method of analysis identified by the EPA is used. Laboratories may not offer all analyses at each of their locations, so multiple laboratories may be needed. Vessels need to plan ahead to determine where and when discharges can be sampled to ensure samples can be quickly sent to laboratories for analysis.

ABS has identified various laboratories in the US that can provide sampling kits for collection and preservation of samples, and then conduct the necessary analysis identified by EPA. The sampling kits will contain the correct bottles for sample collection, instructions for proper sample collection, the necessary reagents for preservation of samples, and a means to transfer samples to the laboratory. The sampling kits may be maintained on board a vessel for an extended time until sampling occurs. This ensures that the method of collection and handling supports methods used by the laboratory. Laboratories can also assist in planning a vessel's sampling activities, and can answer questions on sample collection, and preparing the required EPA documentation.

ABS Monitoring Assistance

For additional assistance with EPA VGP monitoring or laboratory details, please contact environmentalperformance@eagle.org.