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U.S. Department of Homeland Security

United States Coast Guard

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COMDTPUB P16700.4
NVIC 01-04

USCG-2001-9267-14

JAN 2 2004

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 01-04

Subj: SHIPBOARD TECHNOLOGY EVALUATION PROGRAM (STEP): EXPERIMENTAL BALLAST WATER TREATMENT SYSTEMS

Ref:
(a) Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA 1990) (Public Law 101-646)
(b) National Invasive Species Act (NISA 1996) (Public Law 104-332)
(c) Implementation of NISA 1996, 33 CFR Part 151 Subparts C and D
(d) Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens, International Maritime Organization (IMO) Resolution A.868 (20), adopted November 1997
(e) United States Coast Guard Report to Congress on the Voluntary National Guidelines for Ballast Water Management, June 2002
(f) Federal Register Request for Comments (66 FR 28213, May 22, 2001) "Approval for Experimental Shipboard Installations of Ballast Water Treatment Systems"
(g) Federal Register Notice and Request for Comments (66 FR 21807, May 1, 2001) "Potential Approaches to Setting Ballast Water Treatment Standards"
(h) Federal Register Advanced Notice of Proposed Rulemaking (67 FR 9632, March 4, 2002) "Standards for Living Organisms in Ship's Ballast Water Discharged in U.S. Waters"
(i) COMDTINST M16475 (series)- National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts Manual

1. PURPOSE. The purpose of this circular is to implement a Shipboard Technology Evaluation Program (STEP) through which foreign and domestic vessel

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owners/operators can apply for acceptance to install and operate experimental ballast water treatment (BWT) systems on their vessels. Treatment systems will not be accepted into STEP independent of a specific vessel. The STEP is a voluntary program available to all vessels subject to the Coast Guard's Ballast Water Management (BWM) regulations, 46 CFR § 151 Subparts C and D. STEP is intended to facilitate the development of effective BWT technologies, thus creating more options for vessel owners/operators seeking alternatives to ballast water exchange. Technology developers and vessel owners/operators have agreed on the need for incentives that will encourage the development of prototype treatment systems and shipboard testing. However, vessel owners/operators have expressed a reluctance to invest the resources to install and operate an experimental treatment system that might not meet discharge standards mandated by future regulations. To address this concern, vessels accepted into this program may be granted an equivalency to future ballast water discharge standard regulations, for up to the life of the vessel or the system, while the prototype system operates satisfactorily. The length of the period of equivalency is dependent upon the date on which the vessel applies to the experimental program. However, in the event that subsequent information on the experimental system indicates the potential for an adverse affect to the environment, risk to the vessel or human health, the testing of the system will be discontinued and acceptance in the STEP will be withdrawn. In addition, participation in the STEP may be discontinued if a system no longer performs satisfactorily. This NVIC establishes the process for vessel owners/operators to apply for acceptance into the STEP, however, the guidance contained in this document is not a substitute for applicable legal requirements; nor is it a regulation itself, thus it is not intended to nor does it impose legally-binding requirements on any party.

2. ACTION.

   a. Vessel owners/operators. The vessel owners/operators shall be the applicant. This NVIC applies to those vessels defined in 33 CFR § 151.2005. The acceptance process and application instructions are contained in Enclosures (1) through (3) to this NVIC. Potential applicants should contact the Coast Guard, Environmental Standards Division (G-MSO-4) staff at 202-267-2716 or by e-mail at EnvironmentalStandards@comdt.uscg.mil prior to submission, to discuss the process. Application packages are also available for downloading on the U.S. Coast Guard's website at http://www.uscg.mil/hq/g-m/mso/mso4/bwm/step.htm.

   b. Documentation required for vessels accepted in the STEP is described in Enclosure (4) to this NVIC. Vessels exporting Trans-Alaskan Pipeline Authorization Act (TAPS) oil that are regulated by 15 CFR 754.2(j)(1)(iii) are not eligible for acceptance into the STEP because these vessels are required to conduct ballast water exchange unless doing so would endanger the safety of the vessel (see 33 CFR 151.2040(b)).

c. Potential applicants should be aware that because the performance of existing technology is expected to improve, the criteria for the efficacy of experimental systems may become more stringent in subsequent years. Any changes in the acceptance criteria will not affect vessels that are already accepted into the STEP.

d. U.S. vessel owners/operators must submit drawings, details and information on the interface between the proposed BWT system and the vessel's vital systems to the vessel's classification society or the USCG Marine Safety Center. This submittal must include documentation describing how the interface does not degrade existing systems or create dangerous conditions.

e. Foreign vessel owners/operators must provide documentation that indicates that the proposed installation is to the satisfaction of the vessel's classification society or Administration.

f. Coast Guard Marine Safety Office/Detachment Inspectors. Enclosure (4) describes the required documentation that must be maintained on board the vessel. Enclosure (5) discusses how to verify vessel compliance with this NVIC. Installed systems should be inspected to ensure the vessel's safety has not been compromised due to the installation. After vessel inspection, the following text should be entered into MISLE under the "Vessel Inspection Activity, Narrative" tab: "EXPERIMENTAL BALLAST WATER TREATMENT SYSTEM VERIFIED IAW NVIC 01-04. PERFORMANCE LOG AND REPORTING FORMS EXAMINED."

g. Coast Guard Marine Safety Center (MSC). Owners/operators of U.S. vessels that are not classed by a classification society, and applying for acceptance under this program, must submit information on the interface between the BWT system and the vessel's vital systems to the MSC. This submittal must include documentation describing how the interface does not degrade existing systems or create dangerous conditions. It is recommended that a registered professional engineer, as outlined in NVIC 10-92, be used for this process. The MSC will verify that the proposed BWT system will not compromise the vessel's safety.

h. Coast Guard Commandant, Office of Marine Safety, Security, and Environmental Protection, Environmental Standards Division (G-MSO-4). G-MSO-4 is the point of contact for all questions related to this NVIC. G-MSO-4 will accept application packages, provide guidance and notify applicants of acceptance into STEP. G-MSO-4 will monitor experimental results, reports and vessel compliance in the program.

i. Classification Societies. Vessel owners/operators of vessels that are classified by a classification society, and applying for acceptance under this program, must submit information on the interface between the BWT system and the vessel's vital systems to the vessel's classification society. This submittal must include documentation describing how the interface does not degrade

existing systems or create dangerous conditions. Classification societies should examine proposed installations and ensure the BWT system does not adversely impact the vessel's vital systems and does not compromise the vessel's safety. Except where governed by internal policy, classification societies are not expected to inspect or verify the operational characteristics of the experimental system. The scope of classification society inspections should encompass overall safety considerations, including the interface between any vital systems and the experimental system.

3. DIRECTIVES AFFECTED. None.

4. BACKGROUND. The unintentional introduction of non-indigenous species (NIS) into the waters of the United States via the discharge of ships' ballast water has had a significant impact on the nation's marine and freshwater resources, biological diversity, and coastal infrastructure. Although many of these organisms are capable of being transported by numerous mechanisms, there is significant evidence that ships are an important vector. Of the several means of introduction attributable to ships, ballast water is significant and is the first mechanism to receive Congressional attention. In response to highly publicized ballast-facilitated invasions by several species in the Great Lakes and continuing reports of similar invasions in other waters, the Coast Guard is implementing the Shipboard Technology Evaluation Program.

   a. The US Coast Guard is developing regulations that will require BWM programs to meet mandatory ballast water discharge standards. An advanced notice of proposed rulemaking (ANPRM) entitled "Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters" (67 FR 9632) was published on March 4, 2002. The comments from this ANPRM are being used in the development of ballast water discharge standards. Currently, alternative ballast water treatment (BWT) technologies to meet these future standards are not fully developed. An increasing number of alternative BWT technologies capable of significantly reducing the probability of introducing foreign organisms via ballast water discharges are being developed and tested as small-scale prototypes. However, complete evaluations and refinement of the capabilities of such systems require ship-scale installations that are tested for longer periods of time under a wide range of conditions. This program is intended to facilitate shipboard testing of prototype treatment systems aboard a limited number of vessels for research and development purposes. Lessons learned in this effort will help resolve the technical challenges associated with employing these systems on operational vessels. The results of this program will also facilitate a separate process to develop the formal approval procedures of BWT systems for general use.

   b. As on-board installation and testing costs are likely to be significant, vessel owners/operators are understandably reluctant to participate in onboard testing projects. To encourage ship owners/operators to participate in projects designed to test the effectiveness of prototype treatment systems under real world, operational conditions, the Coast Guard is implementing STEP. Under

this experimental program, an accepted vessel would be considered equivalent to future ballast water discharge standards, for up to the life of the vessel or system, while the system operates properly. The length of the period of equivalency is dependent upon the date on which the vessel applies to the experimental program. See Enclosure (1) for further details.

5. IMPLEMENTATION.

a. Application. Enclosures (1) through (3) provide guidance for vessel owners/operators when applying for acceptance into STEP. Applications for STEP may be submitted beginning April 1, 2004 and should be mailed to:

Commandant (G-MSO-4) STEP
United States Coast Guard
2100 Second Street, S.W.
Washington, DC 20593-0001

b. Acceptance Process. Application packages will be reviewed as outlined in Enclosure (2). It is anticipated that the initial review process will take approximately 45 days, assuming additional information is not required from the applicant. The applicant must install the experimental equipment within one year of the acceptance date. The applicant will be required to submit quarterly and annual status reports discussing information as outlined in the study plan. STEP has been designed to receive applications from vessel owners/operators that have not yet installed experimental BWT systems, however, owners/operators of vessels with existing systems may apply to STEP. Application packages received for vessels with an already installed ballast water treatment system will be reviewed on a case-by-case basis and must specifically outline that the system is existing and document past performance. Applicant vessels with pre-existing systems may be required to revise study plans. Vessels accepted into the STEP will be required to follow the approved operational guidelines and study plan, and maintain documents as detailed in Enclosure (4). Specific ships will be accepted into STEP. Treatment systems, per se, will not be accepted independent of a specific vessel. Vessels accepted into the STEP will be subject to routine verification by Coast Guard personnel. Coast Guard inspectors will be guided by Enclosure (5).

c. System Operation. The vessel will be granted an equivalency with existing BWM regulations beginning with the installation of the experimental system on the vessel. The experimental system will be operated under two phases during the equivalency period. An experimental phase and a monitoring phase. Throughout the equivalency period, the ballast water treatment system will be closely evaluated as outlined in the study plan and Enclosure (2). During the monitoring phase, the vessel owners/operators will only be required to submit annual reports on the ballast water treatment system. During both phases, the experimental system shall be the primary method of ballast water management. During the experimental phase, the vessel owners/operators

shall comply with 33 CFR § 151 Subparts C and D if the treatment system is not in use. With the exception of the equivalencies outlined by this NVIC, discharged ballast water must meet all other federal, state, local, and tribal environmental regulations (e.g., residual concentrations of any primary treatment chemicals, chemicals that occur as disinfection by-products, or other water quality parameters of the discharged BW affected by the treatment process).

d. Conditions for continued program participation. Specific conditions for each vessel may be identified when the vessel is accepted into the STEP. The minimum requirements for continued participation in the STEP include the following:

(1) The experimental BWT system must be installed on the vessel within one year of the date of acceptance into the STEP.
(2) The vessel owners/operators must maintain evidence of classification society or Marine Safety Center concurrence with the installed system, which may include documents stamped "EXAMINED", a class report or condition of class.
(3) The vessel owners/operators must follow the accepted study plan. Amendments to accepted study plans must be submitted to G-MSO-4 with a justification discussion. Approval may be granted on a case-by-case basis.
(4) At the conclusion of the first year of the experimental phase, the prototype system must be shown to be operating consistently, and the operational parameters chosen to monitor engineering performance must be shown to closely and consistently reflect the biological efficacy of the treatment system. If, while adapting the system to operational vessels, the system cannot be made to operate reliably and consistently as intended in the application, STEP acceptance will be withdrawn.
(5) The vessel owners/operators must submit annual and quarterly reports on schedule. Vessels with reports overdue in excess of 4 months may be withdrawn from STEP.
(6) The installed system must be operational. While system operation and maintenance challenges are expected, a vessel without an operational system for more than 6 consecutive months, without notification to, and agreement by, G-MSO-4, will be withdrawn from STEP.
(7) Any vessel with a system found to have an adverse impact on the environment or presenting a risk to the vessel or human health will be withdrawn from the program.

e. Conditions at time of withdrawal. At the time of withdrawal, the vessel will be required to meet all existing regulations and standards. The vessel owners/operators may voluntarily withdraw the vessel from the program at any time and the vessel will be required to meet all existing regulations and standards at the time of withdrawal.

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. The Coast Guard will independently evaluate environmental considerations for each application in accordance with the National Environmental Policy Act and the Endangered Species Act. Applicants are advised that proposals, including novel processes or chemicals, may encounter significantly longer reviews than outlined in Enclosure (1).

7. FORMS/REPORTS. Application packages are available from Coast Guard, Environmental Standards Division (G-MSO-4) staff at 202-267-2716 or EnvironmentalStandards@comdt.uscg.mil and are also available for downloading on the U.S. Coast Guard's website at http://www.uscg.mil/hq/g-m/mso/mso4/bwm/step.htm. Documentation required for vessels accepted in the STEP is described in Enclosure (4) to this NVIC.

8. EFFECTIVE DATE. These guidelines are effective upon receipt and will remain in effect until revised or superseded. They may also be amended as necessary to align with future legislation or regulations.

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Encl: (1) Acceptance Process and Period
(2) Criteria and Conditions for Acceptance
(3) Application Instructions
(4) Required Vessel Documentation
(5) USCG Verification Checklist
(6) Definitions and Acronyms

Non-Standard Distribution:

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Acceptance Process and Period

1. **Responsibility**: The acceptance of vessels into the Shipboard Technology Evaluation Program (STEP) will be the responsibility of the Coast Guard.

2. **Purpose**: The primary purpose of the STEP is to encourage the development of experimental ballast water treatment (BWT) systems and provide opportunities and incentives for ship owners to test the effectiveness of prototype systems under real world operational conditions.

3. **Basis of Acceptance**: The Coast Guard will accept or reject each application on the basis of reviews by Coast Guard staff and the recommendations of an independent review panel.

4. **Requesting Application Packages**: Prospective applicants should contact the Environmental Standards Division (G-MSO-4) to discuss the application process. Application packages are available for download from the G-MSO-4 web page (http://www.uscg.mil/hq/g-m/mso/mso4/bwm/step.htm) and can also be obtained from G-MSO-4 (202-267-2716).

5. **Application Package Submission**: The acceptance process begins with the submission of the application package. The application package will be evaluated for completeness and either forwarded to the independent panel for review or returned to the submitter for correction and re-submittal. The initial evaluation for completeness will typically be completed within 10 working days of receipt of the application.

6. **Independent Review**: The purpose of the independent review is to ensure that vessels accepted into the STEP are conducting rigorous and scientifically supportable test programs. Formal reviews of the supporting documentation will be conducted by an independent panel with expertise in experimental investigations of biota associated with ballast water, water treatment technology, naval architecture, and marine engineering. Some panel members will be employees of the Volpe National Transportation Systems Center, while the services of others will be secured from the private sector through contracts, as needed. Representatives of other federal agencies may also participate on review panels. Conflict-of-interest laws and non-disclosure agreements will bind panel members. To make the reviews as uniform as possible, the process will adhere to an explicit protocol, including standard review questions addressing specific issues. These protocols are described in the application package available from G-MSO-4. The goal for the initial panel reviews is 45 working days of the date of determination of application completeness. 45 additional days may be used to resolve outstanding comments.

7. **Program Capacity**: The Coast Guard expects to be able to review at least six complete applications for uninstalled systems annually. Review of applications is dependent on the availability of annually appropriated funds. Applications will be reviewed first for completeness and complete applications will be reviewed in order

of receipt of the complete package. Complete applications received in a calendar year that cannot be reviewed for acceptance during that calendar year due to resource constraints will be given first priority for the next calendar year. Applications requesting acceptance for existing systems will be reviewed on a case-by-case basis as permitted by resources.

8. **Acceptance into the STEP**: Criteria and conditions of acceptance are described in Enclosure (2) to this NVIC, and in greater detail in the application package available from G-MSO-4. In deciding whether or not to accept vessels into the STEP, the Coast Guard will consider the findings of the independent review panel regarding the supporting evidence and proposed study plan. However, other criteria, such as those related to safety and conformity with all existing environmental regulations could outweigh a favorable panel review of the supporting evidence and study plan. Rejections will be fully explained, and applicants will be allowed to resubmit revised proposals without prejudice.

9. **Conditions of Acceptance**: General conditions of acceptance are explained in Enclosure (2) to this NVIC. Specific conditional requirements will be identified for each vessel accepted into the program, based on the details of the vessel's design, operation, and study plan. With the exception of the equivalencies outlined by this NVIC, discharged ballast water must meet all other federal, state, local, and tribal environmental regulations (e.g., residual concentrations of any primary treatment chemicals, chemicals that occur as disinfection by-products, or other water quality parameters of the discharged BW affected by the treatment process).

10. **Applications for Vessels with Existing BWT Systems**: Although STEP has been designed to receive applications from owners/operators of vessels that have not yet installed experimental BWT systems, owners/operators of vessels with existing systems may apply to STEP. The criteria and conditions of acceptance described in Enclosure (2) and in the application documents are based on applications for proposed installations. However, the Coast Guard recognizes that the study plans for these "in-progress" efforts were not developed for this program. Application packages for "in-progress" efforts will be reviewed on a case-by-case basis by the review panel and must specifically outline that the system is existing and document past performance. While credit will be given for aspects of the study plan that meet STEP criteria, the panel may recommend that additional work is necessary to qualify for acceptance into the STEP.

11. **Equivalency Period with Experimental and Monitoring Phases**: The experimental BWT system will be operated in two phases: an initial 5 year experimental phase and a subsequent monitoring phase. During the experiemental phase, the BWT system will be closely evaluated as outlined in the study plan and Enclosure (2). During the monitoring phase, the vessel owners/operators will only be required to submit annual reports on the operation of the BWT system. During both phases, the experimental system shall be the primary method of ballast water management (BWM). The vessel shall comply with 33 CFR § 151 Subparts C and D if the experimental treatment system is not in use. Together, the experimental and monitoring phases constitute the equivalency period. The length of the

equivalency period for a vessel accepted into the STEP will vary depending on when the application is made. Systems accepted into the STEP will be subject to all subsequent applicable standards and regulations upon the expiration of the equivalency period. In the event that results of the study, or other evidence, indicates the potential for an adverse effect of the experimental treatment system on the environment or human health, the acceptance of the vessel in the STEP may be rescinded based on a determination by the Coast Guard.

(a) Experimental Phase: The date of installation of the experimental system marks the beginning of a five-year experimental phase. The conditions of participation during the five-year experimental period are outlined in Enclosure (2). Ballast water discharged properly from a vessel accepted into STEP will be considered equivalent to any future ballast water discharge standards and regulations during this experimental phase.

(b) Monitoring Phase: Subsequent to the Experimental Phase, owners/operators of vessels accepted into the STEP will monitor and record the operation of the prototype BW treatment system until the expiration of the Equivalency Period. The conditions for the continued acceptance in the STEP following the Experimental Phase are outlined in Enclosure (2). Ballast water discharged properly from a vessel accepted into STEP will be considered equivalent to any future ballast water discharge standards and regulations during this Monitoring Phase.

(c) Equivalency Period: The date of implementation of ballast water management BWM requirements marks the beginning of the Equivalency Period for each vessel in STEP with an installed BWT system and accepted study plan. Ballast water discharged from a participating vessel using an experimental system as outlined in the study plan will be considered equivalent to future BWM regulations until the expiration of the Equivalency Period for the participating vessel. If the owners/operators of the vessel voluntarily drops out of the STEP for any reason, the vessel will be required to meet all applicable regulations and standards at the time of withdrawal. At the end of the Equivalency Period, the vessel will be required to meet all applicable regulations and standards.

(d) Length of Equivalency Period: The length of the equivalency period is dependent upon the date on which the vessel owners/operators apply to the experimental program. Vessels owner/operators that submit a complete application package:

(1) prior to the date of publication of the final rule announcing ballast water discharge (BWD) standards will, if accepted into the STEP, be considered to meet the requirements of subsequent BWD regulations for the life of the vessel or the life of the system, whichever is less;
(2) after the date of publication of the final rule announcing the BWD standards, but before the date at which the vessel is required to meet the BWD standards, will be considered to meet the requirements of subsequent BWM regulations for 10 years, or the

life of the system, whichever comes first;

12. **Sample Timeline for the Acceptance Process and Equivalency Period**: The following table and accompanying figure shows an approximate timeline for the initial acceptance of and continued participation of a vessel in the STEP.

DATE	ACTION
Date submitted (S)*	The application is received by USCG and reviewed for completeness.
S + 10 days	The application is evaluated for completeness, and forwarded for review by the independent panel or rejected as incomplete.
S + 45 days	The proposal is reviewed by the panel and the USCG. The application is either accepted, accepted subject to revision, or denied. Final acceptance depends on agreement of a revised application, if necessary.
S + 90 days (A)**	Independent panel review complete and comments resolved. Notification provided to applicant. This date is considered the Acceptance Date.
A + 3 months	First progress report submitted to the USCG.
A + 6 months	Second progress report submitted to the USCG.
A + 9 months	Third progress report submitted to the USCG.
A + 12 months	The first Annual Report (the installation report) is submitted to the Coast Guard. The study continues according to the schedule, with subsequent quarterly and annual reports, dated from the date of installation, submitted to the U.S. Coast Guard. If installation occurs sooner than 12 months following acceptance, the actual date of installation establishes the beginning of the new reporting schedule.
Install (I)***	Experimental system installed on board the vessel, adjusted and demonstrated to work consistently. Installation must be complete within 1 year of Acceptance. Experimental work begins. Installation marks the beginning of the 5-year Experimental Phase.
I + 1 year	The vessel must have completed the Year-1 experiments. Vessel subject to USCG inspection of experimental installation.
Standard/Regulation (R)****	First US BW discharge standards are applicable to the subject vessel. Operation of experimental system continues.
I + 5 years	The vessel must complete testing of the system under the under the year-5 experiments.

R + 10 years	For STEP participating vessels with complete application packages submitted after the publication date of the first ballast water discharge standards, the period of equivalency in the program ends, and the vessel is subject to existing regulatory requirements for BWM and discharge.
R + Life of Vessel/ Life of satisfactorily operating experimental BWT system	For STEP participating vessels with complete application packages submitted before the publication date of the first ballast water discharge standards, the period of equivalency in the program ends, and the vessel is subject to existing regulatory requirements for BWM and BW discharge.

*S = Submission Date
**A = Acceptance Date
***I = Installation
****R = Regulation Date

Criteria and Conditions of Acceptance

1. **Criteria for Review:** Owners/operators applications to the STEP will be evaluated using a set of standardized criteria. Interested parties should contact G-MSO-4 and request a package of application materials. Application packages are also available for downloading on the U.S. Coast Guard's website at http://www.uscg.mil/hq/g-m/mso/mso4/bwm/step.htm. Applications should be developed only after carefully reviewing the application instructions, but in general, the following criteria will be evaluated:

   a. Letters of Commitment. From all principals stating their intent to carry out all components of the study plan for which they are responsible. The principals include the owners/operators of the specified vessel, the manufacturer or developer of the treatment system, and the principal investigators conducting the tests.

   b. System Description. Location, arrangement, and integration with existing equipment; all relevant piping modifications; system start-up and operating procedures; principles of operation; unit construction, materials, and standards; powering; controls and monitoring; performance specifications and limitations; and the expectations of performance in this particular application.

   c. Environmental Compliance Assurances. Documentation that the treatment system meets all applicable Federal, State, Local, and Tribal environmental regulatory requirements.

   d. Class Conformity. Documentation that the system and its installation are acceptable to the vessel's classification society or the Marine Safety Center. This may include documents stamped "EXAMINED", a class report or condition of class.

   e. Prior Experimental Results. Documentation from prior experiments such as bench-scale, test bed, or shipboard scales that demonstrates the potential of the system to significantly reduce the threat of introducing NIS via ballast water discharges.

   f. Proposed Study Plan. A detailed explanation of the general approach, specific goals and hypotheses, and the experimental design.

   g. Vessel Specifics. A detailed description of the vessel being installed with the experimental system which includes, but is not limited to: name, owner, operator, classification society, IMO number, length, draft, year built, gross tonnage, number and size of ballast tanks, and type and amount of cargo.

   h. Route. A detailed explanation of the route that the vessel normally transits, geographic ports visited and typical ballast procedures at these locations.

2. **Criteria for Acceptance**:

   a. Vessels will be accepted for operation in all U.S. waters, including the Great Lakes and the Hudson River upstream of the George Washington Bridge.

   b. Specific ships will be accepted into the STEP. Treatment systems, per se, will not be accepted independent of a specific vessel.

   c. Experimental systems must be designed to kill or remove organisms in ballast water, and treatment efficacy must be determined for three groups of organisms: eukaryotic organisms larger than 50 microns, eukaryotic organisms smaller than 50 microns, and bacteria.

   d. Experimental systems will be required to achieve minimal levels of biological efficacy to qualify for entry into the STEP, and for continued acceptance in the program following the experimental period. For entry into the STEP, preliminary experiments, prior to system installation aboard the vessel, must demonstrate that the system achieved 98% removal of organisms larger than 50 microns (preliminary data from experiments by the Smithsonian Environmental Research Center evaluating the efficacy of mid-ocean exchange indicate that 98% of coastal zooplankton can often be achieved). Biological efficacy must also be reported for eukaryotic organisms smaller than 50 microns and for bacteria (total culturable using at least 2 different and appropriate growth media).

   e. Acceptance of a vessel in the STEP will be withdrawn if, after 1 year, the experimental system is not installed and testing has not begun as outlined in the study plan.

3. **Conditions of Acceptance**:

   a. Continued participation of a vessel in the STEP will be contingent on adherence to the detailed study plan agreed to by the U. S. Coast Guard. It will be the responsibility of the vessel owners/operators to ensure that all experiments and evaluations are conducted in accordance with the accepted study plan.

   b. Study plans for accepted vessels will include two types of evaluations that will take place over the five year period following installation: intensive primary experiments and ongoing performance monitoring. Primary experiments will be conducted during the first year after installation of the prototype treatment system. Multiple primary experiments should be conducted during this period to evaluate the consistency and reliability of treatment over the range of operating conditions provided by the vessel's schedule. These initial primary experiments will also be used to establish the relationship between system performance parameters (i. e., dose, power, flow, pressure, etc) and treatment efficacy. Following the primary experimental period in the first year, performance monitoring will be conducted on an ongoing basis to evaluate the engineering performance of the prototype system as it is used to treat all ballast

water discharged. In the fifth year following installation, a primary experiment will be conducted to establish an estimate of system efficacy for comparison with the results observed in the first year. For continued participation in the STEP following the experimental period, the biological efficacy of the system during the final primary experiment in year 5 must at least meet 90% of the average of the efficacies observed during the initial primary experiments (those conducted immediately following installation).

c. Study plans will include monitoring of the engineering performance of the experimental ballast water treatment systems during the entire time the vessel is participating in the STEP. The study plan will identify the appropriate parameters to monitor, which will, to some extent, depend on the specific system, vessel, and operating regime. Engineering performance will include parameters appropriate for evaluating life cycle management, maintenance, testing and calibration, repair through anticipated service life, and other attributes as deemed appropriate by the applicant and the review panel. This data will be recorded in the performance log (see Enclosure 4), which will be kept up to date and made available to the Coast Guard or its agents upon request.

d. The vessel owner will submit regular progress reports to the USCG. Quarterly status reports, identifying study plan tasks completed and unanticipated problems will be submitted during the experimental phase. Annual reports will be submitted for each year that the vessel is in the STEP. For purposes of the STEP, the first year is defined as the 12 month period following acceptance into the STEP, and each subsequent 12 month period will be defined as the second, third, fourth, etc, year, as appropriate. Annual reports will summarize the work done and results obtained during each year, and will be submitted within 4 months following the end of the year. The final experimental report submitted at the end of the 5-year experimental phase will summarize the biological and engineering performance results for the entire experimental phase. Annual reports submitted for subsequent years will summarize the engineering performance of the system.

e. Vessels accepted into the STEP will be subject to inspections by the Coast Guard or its agents to verify the presence and condition of experimental systems.

f. An annual workshop will be organized to bring together technical representatives from accepted vessels, the Coast Guard, and other agencies and organizations as appropriate, to discuss the technical findings from the STEP. These discussions will help improve STEP procedures and facilitate general understanding of technical issues involved in testing ballast water treatment systems on ships. Owners of vessels accepted into the STEP will ensure that at least one representative, with in-depth knowledge of the complete system and capable of presenting and discussing the details and results of the test program with technical representatives of other vessels attends this workshop.

Application Instructions

1. **General**: Applications for approval of experimental ballast water treatment systems will be accepted and reviewed via the following process:

   a. Applications for approval of experimental BWT systems may be submitted beginning 01 April 2004. Potential applicants are strongly encouraged to discuss the process with G-MSO-4 prior to submission of applications.

   b. Application packages can be accessed via the Internet at http://www.uscg.mil/hq/g-m/mso/mso4/bwm/step.htm. Application packages can also be requested via phone (202-267-2716), postal mail, facsimile transmission (202-267-4690), or electronic mail (EnvironmentalStandards@comdt.uscg.mil).

   c. Completed applications shall be submitted to:

   Commandant (G-MSO-4) STEP
   United States Coast Guard
   2100 2nd Street S.W.
   Washington, DC 20593-0001

   d. The application package will be evaluated for completeness and either forwarded to the independent panel for review or returned to the submitter for correction and re-submittal. The initial evaluation for completeness will typically be completed within 10 working days of receipt of the application. Incomplete packages will not be submitted to the independent panel for consideration, but will instead be returned to the submitter with an explanation of the reason(s) the package is incomplete. Applicants will be allowed to resubmit after completing the application package, with no prejudice.

   e. Complete applications received by the Coast Guard will be immediately forwarded and evaluated by a review panel under the coordination of the Department of Transportation's Volpe National Transportation Systems Center (Volpe). The information will also be shared with U. S. Fish and Wildlife Service, the National Marine Fisheries Service, state coastal commissions, state historic preservation officers and other necessary regulatory officials.

   f. Upon receipt of the application for full review, applicants will be sent (via postal mail, electronic mail, or facsimile transmission) a letter of introduction explaining the review process.

2. **Components of the Application**: Applications will be evaluated on the completeness of the following information:

a. A letter of commitment from the vessel owner, the manufacturer or developer of the treatment system, and the principal investigators conducting the tests, stating their intent to carry out all components of the study plan for which they are responsible.

b. A complete system description including:

(1) Location, arrangement, and integration with existing equipment.
(2) Vessel specifics.
(3) Vessel Route.
(4) All relevant piping modifications.
(5) System start up and operating procedures.
(6) Principles of operation.
(7) Unit construction material and standards.
(8) Power system and requirements.
(9) Controls and monitoring.
(10) Performance specifications and limitations.
(11) The expectations of performance in this application.

c. Documentation stating that the residual concentrations of any primary treatment chemicals, chemicals that occur as disinfection by-products, or other changes to water quality parameters of discharged ballast water meet all applicable local, state, federal, and tribal requirements. Any significant effects on the quality of human health and the environment that are not mentioned elsewhere in the application should also be documented.

d. Documentation that the system and its installation are acceptable to the vessel's classification society or the Marine Safety Center. This may include documents stamped "EXAMINED", a class report, or condition of class. Acceptance into STEP does not take the place of class society requirements.

e. Documentation from prior experiments that demonstrates the potential of the system to significantly reduce the threat of introducing nonindigenous species via ballast water discharges. The results would demonstrate a taxonomic breadth of effectiveness across a suite of organisms such as, but not limited to, bacteria, phytoplankton (including dinoflagellates and diatoms), heterotrophic protists, rotifers, copepods (cyclopoid and harpacticoid; larval, post-larval, and adult life stages), mollusc larvae, polychaete larvae, mysids, decapod crustaceans (crabs and shrimp; larval, post-larval; and adult), and fish.

f. A statement with explanations of the scalability of prior experiments relative to the proposed shipboard installation.

g. A detailed study plan that is organized according to a standardized format outlined in the application package.

STEP Documentation

1. **General:** Documentation will be maintained by vessel owners/operators to record and report the experimental ballast water treatment system performance and operation history. This documentation shall be made available to USCG Marine Inspectors when requested.

2. **Documentation:** Vessels accepted into the STEP will need to maintain the following documentation on board the vessel:

   a. Conditions of class in regards to the experimental BWT system, if applicable.

   b. Documentation that the BWT system meets all Federal, State, Local and Tribal environmental regulations.

   c. The Coast Guard accepted study plan.

   d. System manufacturer's technical guides and publications.

   e. Material safety data sheets for all chemicals utilized in conjunction with the experimental BWT system.

   f. A ballast water system performance log.

   g. A copy of all quarterly and annual reports forwarded to the Coast Guard.

   h. Copies of BWM reports in accordance with 33 CFR Part 151.

3. **Performance Log:** A performance log will be maintained to document and record the experimental BWT system performance and maintenance history. This log will be kept up to date and made available on demand. All entries in this log will include the date, time and location of the activity. This log shall include, but is not limited to the following activity entries:

   a. The starting and stopping of the experimental system for the purpose of treating ballast water.

   b. The taking on of ballast water on board the vessel.

   c. The discharge of ballast water from the vessel.

   d. All ballast water exchanges.

   e. The discharge and disposal method of sediments.

   f. Ballast tank cleaning, maintenance or coatings.

g. System malfunctions, or unexpected results, including problem resolution.

h. Both scheduled and un-scheduled maintenance of the system.

i. All relevant measures of performance recorded during system operation.

4. **Reports:** Owners/operators will submit quarterly and annual reports to the Coast Guard. As each experimental system will differ depending on design and method, reports should reflect experiment progress, problems encountered and experimental results as outlined in the vessel's acceptance into the STEP program. Reports should be submitted as follows.

   a. Short, concise quarterly status reports identifying tasks completed and unanticipated problems encountered

   b. An annual report in detail documenting the work and results to date from the beginning of the experiment.

   c. A final report documenting all study findings and conclusions should be submitted to the Coast Guard no later than six months after the onboard testing is completed.

   d. All reports should be submitted to:

Commandant (G-MSO-4) STEP
United States Coast Guard
2100 Second Street, S. W.
Washington, DC 20593-00016

Experimental System Verification Checklist for Coast Guard Personnel

Vessel Name: _____ Date: _____

Official Number: _____ Class Society: _____

Ballast Water Treatment Type: _____

Date Installed: _____ Manufacturer: _____

Is Performance Log being maintained?: Yes_____ No_____

Remarks: _____

Is vessel submitting Ballast Water Reporting Forms to SERC?: Yes__ No__

Remarks: _____

Are all required documents on board (Enclosure 4)? Yes_____ No_____

Remarks: _____

Operation & Maintenance Manuals On Board: Yes_____ No_____

Instructions & Safety Notices Posted: Yes_____ No_____

Safety & Installation Assessment: (Location, arrangement and integration with existing equipment), Crew Noted Problems: Sat_____ Unsat____

Additional Remarks

_____

_____

_____

_____

Definitions And Acronyms

Definitions:

Administration means the Government of the State whose flag the ship is entitled to fly.

ANSTF means the Aquatic Nuisance Species Task Force mandated under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA).

Ballast water means any water and suspended matter taken on board a vessel to control or maintain, trim, draught, stability, or stresses of the vessel, regardless of how it is carried.

Ballast tank means any tank or hold on a vessel used for carrying ballast water, whether or not the tank or hold was designed for that purpose.

Captain of the Port (COTP) means the officer of the Coast Guard, under the command of a District Commander, so designated by the Commandant for the purpose of giving immediate direction to Coast Guard law enforcement activities within the general proximity of the port in which he is situated. Further defined in 33 CFR Part 3.

Efficacy means the effectiveness of the BWT system kill, or remove, organisms and bacteria.

Equivalency Period means the period, beginning on the applicability date of USCG regulations governing ballast management, where ballast water discharged from the vessel is granted an equivalency to BWM regulations.

Exchange means to replace the water in a ballast tank using one of the following methods:

- **Flow through exchange** means to flush out ballast water by pumping in mid-ocean water at the bottom of the tank and continuously overflowing the tank from the top until three full volumes of water has been changed--to minimize the number of original organisms remaining in the tank.

- **Empty/refill exchange** means to pump out the ballast water taken on in ports, estuarine, or territorial waters until the tank is empty, then refilling it with mid-ocean water; masters/operators should pump out as close to 100 percent of the ballast water as is safe to do so.

Experimental Period means the five-year period, beginning at system installation, where the experimental system will be closely evaluated and reported quarterly.

G-MSO-4 is the Environmental Standards Division in the Office of Marine Safety, Security and Environmental Protection at Coast Guard Headquarters. This office is the program manager for the STEP.

IMO guidelines mean the Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens (IMO Resolution A.868 (20), adopted November 1997).

NANPCA means the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

NBIC means the National Ballast Water Information Clearinghouse operated by the Coast Guard and the Smithsonian Environmental Research Center as mandated under NISA.

NISA means the National Invasive Species Act of 1996, which reauthorized and amended NANPCA.

Sediments means any matter settled out of ballast water within a vessel.

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

Waters of the United States means waters subject to the jurisdiction of the United States as defined in 33 CFR Sec. 2.05-30, including the navigable waters of the United States. For this regulation, the navigable waters include the territorial sea as extended to 12 nautical miles from the baseline, pursuant to Presidential Proclamation No. 5928 of December 27, 1988.

Acronyms:

ANPRM	Advanced Notice of Proposed Rule Making
ANS	Aquatic Nuisance Species
BWD	Ballast Water Discharge
BWE	Ballast Water Exchange
BWM	Ballast Water Management
BWT	Ballast Water Treatment
IMO	International Maritime Organization
NANPCA	The Nonindigenous Aquatic Nuisance Prevention and Control Act
NBIC	National Ballast Information Clearing House
NEPA	National Environmental Policy Act
NIS	Nonindigenous Species
NISA	National Invasive Species Act
NPRM	Notice of Proposed Rule Making
SERC	Smithsonian Environmental Research Center
STEP	Shipboard Technology Evaluation Program