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# United States Coast Guard VIDA Job Aids

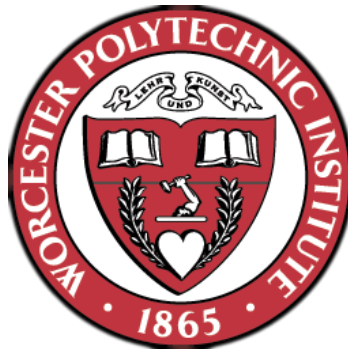
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An Interactive Qualifying Project submitted to the Faculty of  
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in partial fulfilment of the requirements for the degree of Bachelor of Science.

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Report submitted to:

Advisor: Richard Vaz (WPI) Liaison: Debbie Duckworth (USCG) 12/13/19



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## **Abstract**

With the passage of new VIDA regulations, the United States Coast Guard is now tasked with inspecting for environmental compliance on commercial vessels. Our team was tasked with developing a series of job aids that the Coast Guard can use to make these inspections safer, faster, and more accurate than through normal training alone. We accomplished this through codifying the VIDA discharges, interviewing Coast Guard personnel, and gaining feedback on job aid drafts we created. Through our research, we determined a list of criteria that the Coast Guard can use when creating their job aids, both in their content and in their format. Using these criteria, we developed some recommendations on how the Coast Guard can create, implement, and adapt future job aids for environmental inspections.

## **Acknowledgements**

We would first like to thank the United States Coast Guard, as well as RADM Richard Timme and Mr. Jeffrey Lantz for inviting us to work on this project. Thank you to our liaison Ms. Debbie Duckworth for your feedback, support, and invaluable knowledge throughout our time here. We would also like to thank the entire Operating and Environmental Standards (OES) office for their feedback as well and their comments on the job aids within their areas of expertise. Thank you to CAPT Sean Brady and CDR Kimberly Chesteen for providing leadership, support, and council throughout the project as well as coordinating site visits. Thank you to Mr. Michael Rand, LCDR Samuel Danus, LCDR Lucas Elder, and LT Kimberly Gates for their knowledge of inspection processes and protocols as well as being available for interviews. Thank you to Mr. Wayne Lundy and Mr. Thane Gilman of ENG-3 for their feedback and support. We would also like to thank the Commercial Vessel Compliance (CVC) office for their insight as well. Thank you to Coast Guard Sector Hampton Roads and Sector Baltimore for accommodating our shadowing of inspections. Special thanks to CWO Dennis Cruyle and CWO Woodrow Speaks. Also, thank you to Coast Guard Sector Yorktown for facilitating a meeting and interviews and for your feedback and support. Finally, we would like to thank Professor Richard Vaz and Professor Robert Traver for their continued support and insightful feedback throughout the project both on campus and in Washington. Their knowledge of and perspectives regarding IQP and our project were invaluable and have brought the best out of each of us.

## **Executive Summary**

The commercial shipping industry has had a significant impact on the marine environment. For years, the industry has seen regulations enacted by Congress and the Environmental Protection Agency (EPA) to curb the environmental impact that this industry and others like it have. Historically, there has not been a designated means of enforcing these regulations. The enactment of the 2018 Vessel Incidental Discharge Act designated the United States Coast Guard (USCG) as the primary enforcement arm for a variety of regulations imposed on commercial vessels related to ship discharges. The USCG, with their existing comprehensive inspection procedures, is looking for a way to streamline the inspections to reduce the effect of the increased workload on their personnel.

## **Project Goals**

The overall goal of this project was to create a series of job aids for the various discharges regulated by the Vessel Incidental Discharge Act. A job aid is an instructional or informative tool designed to help someone do their job more effectively. These job aids are meant to be used by port state control examiners when conducting routine inspections of vessels. These would help streamline the inspection process and help inspectors do their jobs more efficiently and effectively.

## **Research Objectives**

In order to develop the job aids described above, we developed specifications for job aids that would make them both efficient and easy to use. In order to do this, we created a series of research questions to gain the information necessary to determine these specifications. These research questions were:

- How job aids are used, if at all, throughout current or previous inspection processes.
- Characteristics from existing job aids related to format.
- The types of content included in the job aids.
- Anticipated inspection methods and procedures related to the new regulations.

In order to answer these research questions, we interviewed a variety of different civilian and active duty Coast Guard personnel. These personnel included members from the Commercial Vessel Compliance (CVC) and Operating and Environmental Standards (OES) divisions of the US Coast Guard, and USCG Port State Control Examiners. We also utilized several currently used Coast Guard job aids as inspiration for these new versions. Finally, we conducted site visits to various Coast Guard sectors. This includes Baltimore, Hampton Roads, and Yorktown. These helped to both better understand the flow and timescale of their current inspections, and to gain inspector feedback on the prototype job aids.

## **Job Aid Specifications**

Through our research we concluded that there are two main specifications for each job aid: *content* and *format*.

The content of the job aids includes the following:

**Purpose Statements:** The purpose statements are located at the top of each job aid. These statements describe the reasons for conducting each part of the inspection. Due to the new regulations, the inspections will now take longer to complete, and they will also require more effort. The statements serve as encouragement for the inspectors to spend the added time and effort to perform the inspections completely.

**Standards:** The regulations in the Vessel Incidental Discharge Act (VIDA) are very lengthy and many have extraneous information that is irrelevant to effectively completing an inspection. The job aids include condensed and simplified standards as defined by VIDA. This keeps the job aids from being text heavy and is less information for the examiner to read through.

**Reference Materials:** There are reference materials throughout the series of job aids. Some examples are references to a specific violation within the Vessel Incidental Discharge Act, an entire section of a job aid, or an email/phone number to contact a specific division of the United States Coast Guard. These materials provide context and support for any questions an inspector may have. They also provide specific information that may assist examiners in determining compliance of a vessel such as lists of acceptable cleaning agents, for example.

The format of the job aids focused on three criteria:

**Enforceability:** There are a number of regulations in VIDA which would be difficult to enforce, either due to time constraints or just general feasibility. Many of these regulations follow Best Management Practices (BMPs), which are more suggestions rather than mandatory. This means that the Coast Guard cannot mark violations if the vessel is not compliant with BMPs. Therefore, in each job aid design, the regulations included are only those which are easily determined to be either compliant or non-compliant. Excluding these BMPs also allows for more condensed formatting rather than lengthy pages for each job aid.

**Simplicity:** As inspectors have to inspect a number of vessels each day, the job aids needed to be easy to use and very concise. As shown in the figure below, many of these job aids follow the form of a flow chart, with arrows connecting each step to the next. These steps are surrounded by boxes, some of which are color coded to help the inspector associate certain steps or certain outcomes with compliance or noncompliance. For all of these prototype job aids, a binary yes-or-no system was devised. This system both streamlines inspection procedures and helps inspectors make more definitive decisions by preventing inspectors from making judgement calls.

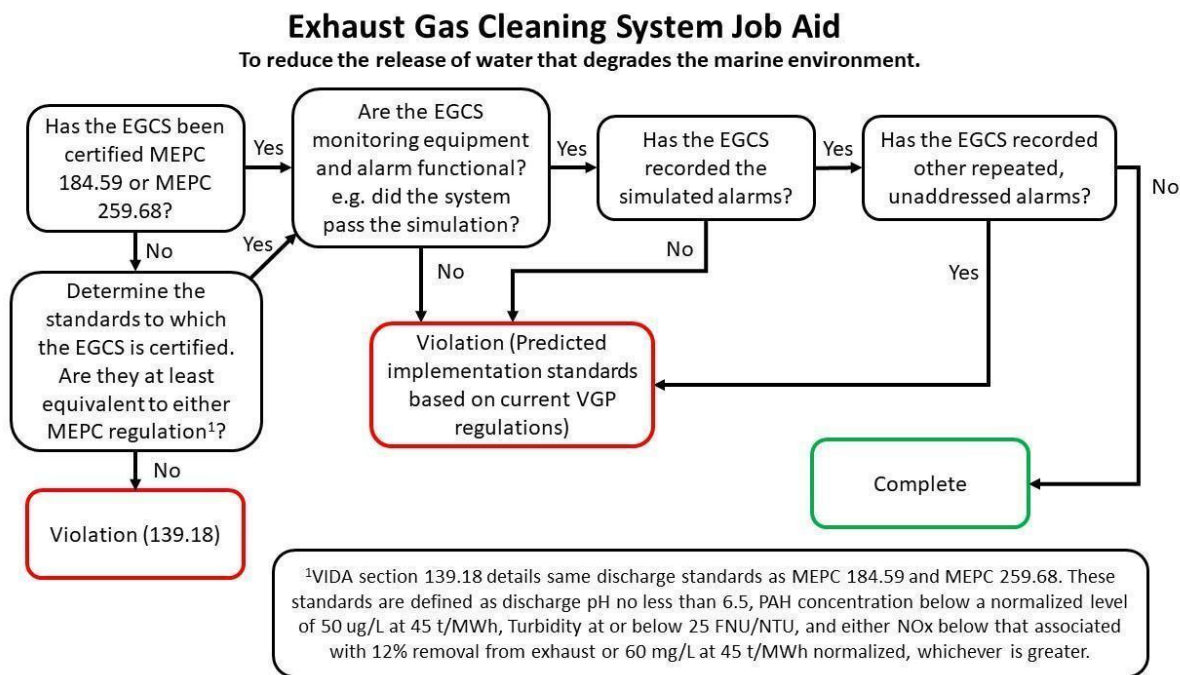


Figure: This is an example of a prototype job aid.

**Consistency:** While these job aids come in a few different types, the formatting in each one is similar. Coast Guard personnel reported that consistency is important for the workflow of inspectors. As such the font, color schemes, wording, and layout of each job aid remained relatively similar to each other. Color coding was also made consistent across each job aid, to be used as a universal code for inspectors to mark for compliance or noncompliance.

### Deliverable and Recommendations

Appendix H of this report shows the series of job aids that is intended to be distributed to Port State Control Examiners. We recommend that the Coast Guard identify changes that need to be made to job aid designs and determine the best methods for implementation.

**Specifications:** Moving forward, we recommend that the USCG develop future job aids utilizing similar, if not the same specifications that we identified. This is especially the case for any future

job aids related to VIDA. The specification will likely be transferable to job aids that are developed from any regulatory documents.

**Implementation:** We recommend that the VIDA implementation protocols developed over the next two years are designed such that any future job aid contains only strictly enforceable decisions. The job aid designs can, in some cases, be used to guide the development of implementation protocols. For instance, many of the job aid designs are predicated on the assumption that the implementation protocols will establish a specific standard of recordkeeping related to the discharges. In cases such as these, we recommend that the USCG establish those standards to ensure that the regulations are readily enforceable.

**Adaptability:** Since the regulations outlined in the draft version of VIDA are likely to change in the future, we recommend that the job aids be modified to reflect these changes. The job aids were developed to be placeholders or templates, allowing for easy modification in the future. Similarly, we suggest that any future job aids be developed with the same goal of being adaptable.

## **Authorship**

| <b>Section</b>                                       | <b>Primary Author</b> |
|------------------------------------------------------|-----------------------|
| 1 Introduction                                       | ALL                   |
| 2.1 United States Coast Guard Mission                | SW                    |
| 2.2 Vessel Incidental Discharge Act                  | DC                    |
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| 3.4 Testing and Refining the Job Aid                 | DC                    |
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\*Note: All sections were edited together by all project team members.



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## Glossary

**Biological Oxygen Demand (BOD):** Amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period.

**CIV:** Civilian.

**Commercial Vessel Compliance Division (CVC):** Division of the United States Coast Guard responsible for the enforcement and protocols regarding commercial vessel inspections.

**Cybutryne:** Effective herbicidal biocide commonly used in anti-fouling paint applied to the hulls of vessels.

**EGCS:** Exhaust Gas Cleaning System.

**Environmentally Acceptable Lubricant (EAL):** A lubricant that is either (1) “biodegradable”, “minimally toxic”, or “not bio accumulative” or (2) Approved by any of the following labeling programs: Blue Angel, European Ecolabel, Nordic Swan, the Swedish Standards SS 155343 and 155470, Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) requirements, or EPA’s Safer Choice.

**Environmental Protection Agency (EPA):** An independent agency of the United States Government responsible for the protection of human health and the environment.

**Fouling:** Accumulation of unwanted materials on solid surfaces to the detriment of function. May consist of either living organisms or non-living organisms.

**ID2050:** Prerequisite class before departing to the project center for IQP.

**International Maritime Organization (IMO):** Subsidiary organization of the United Nations to dictate maritime law and regulations.

**IQP:** Interactive Qualifying Project.

**Marine Information for Safety and Law Enforcement (MISLE):** Database containing information for each vessel, such as flag, crew, cargo, previous infractions, priority, etc.

**Operating and Environmental Standards (OES):** Division of the United States Coast Guard responsible for revising and creating environmental regulations that apply to a variety of maritime vessels.

**Port State Control Examiners (PSCE):** Personnel of the United States Coast Guard who inspect commercial vessels and enforce safety regulations and environmental compliance on them.

**TBT:** Tributyltin, which is an umbrella term for organotin compounds that are used in anti-fouling paint, applied to the hulls of vessels.

**United States Coast Guard (USCG):** Division of the United States Armed Forces responsible for the enforcement of coastal defense, search and rescue, and maritime law within the contiguous waters of the United States.

**United States Coast Guard Headquarters (USCGHQ):** Location in Washington D.C, it is the main facility of the USCG and houses the head personnel of various Coast Guard divisions.

**Vessel General Permit (VGP):** EPA's first legislation on commercial vessel environmental regulations.

**Vessel Incidental Discharge Act (VIDA):** Legislation that delegates the United States Coast Guard to enforce new environmental standards regulating various discharges from vessels.

## ***1. Introduction***

The mission of the United States Coast Guard (USCG) is to protect the nation's coasts and ocean borders. They accomplish this through a multitude of different roles, including drug interdiction, customs enforcement, and armed defense (US Coast Guard: A Multi-Mission Force, 2019). In protecting the coasts, they also serve a critical environmental protection purpose. They must monitor and enforce maritime legislation, as directed by the United States government, to ensure that the nation's waters are not impacted by pollution (US Coast Guard: A Multi-Mission Force, 2019).

To complete this task, the USCG must adhere to environmental regulations enacted by Congress. One such legislation, known by its official title *Vessel Incidental Discharge Act* (VIDA), covers a variety of effluents and discharges ranging from bilge water to commercial fuel (Frank LoBiondo Coast Guard Authorization Act of 2018, 2018). The release of the specified substances cannot exceed certain levels designated by the Environmental Protection Agency (EPA). The act applies to all commercial ships greater than 79 feet in length with the exception of commercial fishing vessels (Frank LoBiondo Coast Guard Authorization Act of 2018, 2018). Coast Guard inspectors will board vessels at scheduled times to perform inspections and confirm that the law is being followed.

To maximize the use of their limited time and ensure consistency, the Coast Guard utilizes a variety of job aids. A job aid is anything that allows a worker to complete their tasks more effectively by providing related instructions or reference materials. Job aids are used throughout a variety of industries from the U.S military to healthcare to the stock market exchange and can take the form of anything from a manual to a checklist to a mechanical device.

The passage of the Vessel Incidental Discharge Act (VIDA) in December 2018 has added a crucial new responsibility to the Coast Guard's mission (Frank LoBiondo Coast Guard Authorization Act of 2018, 2018). They are now tasked with inspecting vessels for their compliance with EPA established standards related to the discharge of a variety of potentially harmful substances. This mission to protect the marine environment is a new challenge; to face this, the Coast Guard has requested a series of job aids that will allow these vessel inspections to be conducted in a safe, efficient, and effective manner.

The goal of this project is to design and evaluate job aids that can assist examiners with inspections of commercial vessels and ensure any discharges are compliant with VIDA. Since VIDA is still in the draft phase, these job aids will serve as templates that can be modified once the final version of VIDA is released.

## ***2. Background***

The following chapter discusses the history and role of the United States Coast Guard in relation to environmental protection. It will discuss the history and problems of previous discharge regulations and explain how VIDA plans to fix them. Finally, it will introduce the concept of job aids, explain their benefits, and demonstrate how a job aid can help the Coast Guard implement VIDA.

### **2.1 United States Coast Guard**

In 1790, “Congress authorized the Secretary of the Treasury, Alexander Hamilton, to create a maritime service to enforce customs laws” (Frequently Asked Questions, 2019). At the time, the USCG mainly focused on the prevention of smuggling (USCG: A Multi-Mission Force, 2019). However, since then, the responsibilities of the United States Coast Guard have expanded. They are now responsible for the defense of coastal areas, customs enforcement, drug interdiction, and numerous other operations (USCG: A Multi-Mission Force, 2019). Protection and preservation of the marine ecosystem serves as another critical aspect of their mission statement.

Washington, D.C. is home to the central headquarters for the Coast Guard and all of its operations, with additional locations across the continental U.S., Alaska, and Hawaii (USCG: A Multi-Mission Force, 2019). In recent years, the Coast Guard has strived to standardize its operations, “establishing clear requirements for capabilities... and putting policy, doctrine and tactics, techniques and procedures in place... [providing] standardization of equipment, operations and tactics, and evaluate readiness,” (Papp, 2013). The headquarters serves as the primary hub for all Coast Guard operations (USCG: A Multi-Mission Force, 2019) including these efforts towards standardization.

Of particular interest is the Marine Environmental Protection role that the Coast Guard performs in US territorial waters. In concert with maritime legislation passed by Congress and standards developed by the Environmental Protection Agency (EPA), the Coast Guard enforces environmental laws for commercial shipping. Various potentially hazardous materials and discharges that commercial shipping traffic may release, either intentionally or accidentally, are closely regulated and observed. To mitigate the adverse effects of these substances, “the Coast Guard develops and enforces regulations” with the goal of preventing the degradation of the marine ecosystem (Marine Environmental Protection in USCG: A Multi-Mission Force, 2019). The Coast Guard has for many years conducted commercial shipping inspections, primarily related to vessel and crew safety. In addition to their past responsibilities, the Coast Guard is now responsible for environmental enforcement due to the enactment of VIDA.

### **2.2 Vessel Incidental Discharge Act**

The main purpose of the VIDA is “to provide for the establishment of uniform, environmentally sound standards and requirements for the management of discharges incidental to the normal operation of a vessel” (Frank LoBiondo Coast Guard Authorization Act of 2018,

Sec. 902, 2018). Included is a list of 22 systems and discharges that must comply with these standards (*see Appendix B*). These consist of, but are not limited to, deck wash-down, bilge water, ballast water, and anti-fouling hull coatings (Frank LoBiondo Coast Guard Authorization Act of 2018, Sec. 902, 2018).

### *2.2.1 Before VIDA*

To understand VIDA, it is helpful to look at the history of its predecessors and its legislation. Before VIDA was enacted, multiple conflicting laws on vessel discharge were in place, each created by one of three groups: the Environmental Protection Agency (EPA), the US Coast Guard, and various US States.

Regulations pertaining to vessel discharge began in 1973, when the EPA implemented the National Pollutant Discharge Elimination System (NPDES) as part of the Clean Water Act (The Commercial Vessel Incidental Discharge Act, 2017). However, these regulations excluded ballast water from inspection as the EPA reasoned “this type of discharge generally causes little pollution and exclusion of vessel wastes from the permit requirements will reduce administrative costs drastically” (The Commercial Vessel Incidental Discharge Act, 2017). However, over the following decades, the environmental pollution, especially invasive species, continued to increase. The EPA eventually responded to this by creating the Vessel General Permit (VGP) in 2008. This solved a few problems, as it included ballast water in its list of regulations (Copeland, pg. 2, 2014). However, the VGP was not enforceable by the Coast Guard. During inspections, examiners would only check that the vessel had a permit and did not delve deeper than that, assuming if the permit was present the vessel was compliant with all environmental regulations.

Meanwhile, the Coast Guard was trying to solve these problems with their own legislation. In 1990, the United States enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) to give the Coast Guard jurisdiction over regulating ballast water discharge (The Commercial Vessel Incidental Discharge Act, 2017). Later, in 2004, the Coast Guard began to follow the International Maritime Organization’s (IMO) standards for fluid discharge (The Commercial Vessel Incidental Discharge Act, 2017). This gave them a very clear set of regulations to monitor. Unfortunately, these regulations have not always been implemented effectively. For example, the Coast Guard has tried to give non-compliant vessels lenient penalties, so they fix their issues and continue to work with the US. However, these lenient penalties, combined with the conflicting regulations from the Coast Guard and EPA, have caused some vessels to cheat the system and continue polluting US waters. (Moffett, 2005, pg. 302).

Many US States decided to supersede these confusing and conflicting federal regulations and create their own. In the end, these state regulations turned out to be more stringent than both the EPA’s and the Coast Guard’s. For example, the International Maritime Organization regulations that the Coast Guard follows allow 1000 times more biomass than the State of California’s regulations (The Commercial Vessel Incidental Discharge Act, 2017). As such, these states have tended to oppose any legislation that gives jurisdiction to a third party, even the



previously mentioned VIDA legislation (Beaven, 2018). However, this opposition has caused even more confusion for both vessel owners and vessel inspectors. In theory, this confusion means that “a commercial vessel owner/operator transiting the full length of the Mississippi River is required to comply not only with applicable Coast Guard requirements under NANPCA/NISA and the EPA's VGP requirements, but also with varying additional VGP permit requirements imposed by the States of Minnesota, Wisconsin, Iowa, Illinois, Missouri, and Arkansas,” (The Commercial Vessel Incidental Discharge Act, 2017). VIDA looks to resolve these concerns by standardizing a series of guidelines on effluent pollution that each group must follow (The Commercial Vessel Incidental Discharge Act, 2017).

### *2.2.2 What Does VIDA Do Differently?*

Due to these conflicting sets of regulations, vessel owners and inspectors never had a clear view on what constituted compliance. This is what inspired the creation of VIDA. VIDA centralizes the standards under one organization and allows for uniform enforcement across all 50 states. VIDA also establishes that the EPA will set these standards and that the USCG will enforce the standards (Frank LoBiondo Coast Guard Authorization Act of 2018, Sec. 902, 2018). To accomplish this, the Coast Guard must create protocols that USCG inspectors can use while on board commercial vessels to check whether or not a system or discharge is compliant with VIDA (Frank LoBiondo Coast Guard Authorization Act of 2018, Sec. 902, 2018). To this end, the Coast Guard has already begun inspections related to Ballast Water Management Systems (BWMS). These systems treat ballast water and render non-viable any living organisms in the ballast before discharge.

While it is not the first piece of legislation that has tried to tackle this problem, VIDA is updated to reflect more recent and clear standards as provided by the EPA. The purpose of this added clarity to the environmental standards is to make the regulations more enforceable. Furthermore, VIDA seeks to make inspection protocols easier to develop and implement.



*Figure 1: VIDA applies to commercial ships above 79 feet in length, such as this Cosco commercial shipping vessel.*

## **2.3 Job Aids**

Instead of training every individual member of a workforce one by one, many organizations have attempted to integrate new and innovative ways to provide training more efficiently. One way some organizations have accomplished this is by adopting job aids as a method to standardize the training. A job aid can be a sign, manual, checklist, etc. that is designed to help people do their job more efficiently and effectively. Job aids are used throughout many industries and organizations (The Advantages of Job Aids). Some examples of the organizations that incorporate job aids into a variety of tasks are the various branches of the United States' Armed Forces. One simple example is the Department of Homeland Security's utilization of a manual for dealing with non-English speakers in an interview (DHS Office of Civil Rights and Civil Liberties, 2012). This job aid is very clear and consistent in its procedure of conducting an interview when an interpreter is needed. It allows for minimal confusion as it lays out step by step processes. The DHS job aid example is meant to be used as a manual or set of guidelines. Job aids such as this increase task effectiveness, while at the same time maintaining work efficiency of the employees.

### *2.3.1 Types of Job Aids*

There are a variety of different job aids that take different forms depending on the application, such as a phone app or an infographic. For tasks that usually require instruction, a manual is likely to be given to employees. If the task is a specific procedure or requires step by step instructions, a sign or checklist may be more likely. However, job aids are not restricted to any of these forms. They can involve visuals as much as text; for example, the job aid could be a diagram of an organizational command structure (USCG Incident Command System, 2015, pg. 2) such as Figure 2. This diagram outlines the rank structure of officers in the Coast Guard. It simply defines the chain of command and the people of rank to speak to in case of an incident.

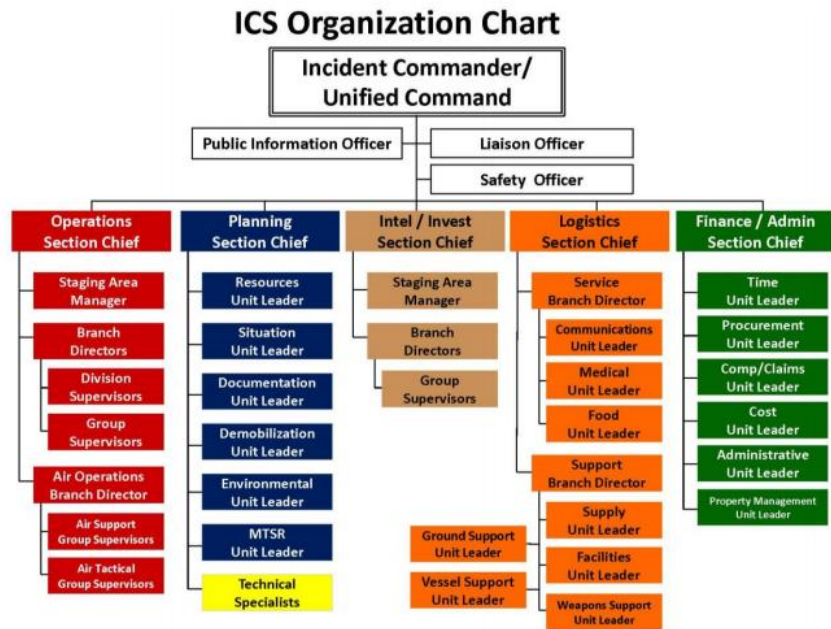


Figure 2: Command Structure Job Aid


Many job aids are now becoming digital. The U.S Military have made job aids in the form of computer programs or digital PDFs. The use of digital job aids has been shown to decrease training time by a factor of 30% (Foster, 2003, pg. 5), which also reduces the expense used to train each military employee. Studies show that the effectiveness of instruction, when compared to traditional training, increases when using computer-based aids (Foster, 2003, pg. 5-6). This results in a reduction in the time and cost of training.

### 2.3.2 United States Coast Guard Job Aids

The United States Coast Guard has implemented a number of different job aids for various tasks. These job aids allow members of the Coast Guard to be self-sufficient and not rely on instructors or supervision to perform these tasks effectively. The Force Readiness Command have published their procedure for creating an efficient job aid. The document details exactly what a job aid entails and how to efficiently implement a quality job aid (USCG Force Readiness Command, 2009, pg. 1). It establishes that job aids are meant to be lasting ways to train and implement procedures from user to user. Job aids are meant to be for an audience whose knowledge and experience varies. Active duty members within the Coast Guard rotate stations and jobs every three years, including examiners. Therefore, a job aid should be lasting and easy to use so that whenever a rotation takes place there is minimal learning curve.

The Coast Guard has implemented multiple job aids for inspectors to use when inspecting ships' mechanical issues. As shown in Figure 3 (below), the Vessel Inspection Checklist, the responses are limited to yes, no, or not applicable in a checklist format (United States Coast Guard, 2010). This checklist meets all the necessary criteria outlined by the Force Readiness

Command for what an efficient and lasting job aid includes. It allows the inspector to complete their job quickly and efficiently using this checklist format, not wasting any unnecessary time. This allows for a quick and accurate check of each of the necessary components. It also allows for the inspector to check these mechanical issues safely. For simple tasks, a checklist is most effective as they meet all the requirements a successful job aid should. However, for more complex tasks other formats may need to be considered. These might include visual guides or aids that can more effectively communicate complex information.



**VESSEL SAFETY CHECK (VSC)**  
To be completed by a U.S. Coast Guard approved Vessel Examiner.  
See the back of this form for a brief explanation of required items.  
A Federal Requirements pamphlet is also available.

Date of VSC: 2/20/17  
Decal Awarded: Yes  No

Owner/Operator Name:  
Georgia Davis, Freelance Davis

Owner/Operator has attended a CGAUX, USPS, State or \_\_\_\_\_ Boating Safety Class: Yes  No

Location of VSC - County: WINDFORD State: FL

Replaced decal was: Last Year  Outdated  First time

**VESSEL INFORMATION:**

Registration or Documentation Number: F 8780-M

HIN: VX12-11-6001

Length: <16  16-25  26-39  40-65  >65

Powered by: Gas  Diesel  Sail  Other

Area of Operations: Inland  Coastal

Type: PWC  Open  Cabin  Other

**VESSEL SAFETY CHECK DECAL REQUIREMENTS**

| Item                                     | Yes | No | N/A |
|------------------------------------------|-----|----|-----|
| 1. Display of Numbers                    |     |    |     |
| 2. Registration/Documentation            |     |    |     |
| 3. Personal Flotation Devices (PFD)      |     |    |     |
| 4. Visual Distress Signals (VDS)         |     |    |     |
| 5. Fire Extinguishers                    |     |    |     |
| 6. Ventilation                           |     |    |     |
| 7. Backfire Flame Control                |     |    |     |
| 8. Sound Producing Devices/Bell          |     |    |     |
| 9. Navigation Lights                     |     |    |     |
| 10. Pollution Placard                    |     |    |     |
| 11. MARPOL Trash Placard                 |     |    |     |
| 12. Marine Sanitation Devices            |     |    |     |
| 13. Navigation Rules                     |     |    |     |
| 14. State and/or Local Requirements      |     |    |     |
| 15. Overall Vessel Condition: as applies |     |    |     |
| a. Deck Free of Hazards / Clean Bilge    |     |    |     |
| b. Electrical - Fuel Systems             |     |    |     |
| c. Galley - Heating Systems              |     |    |     |

**RECOMMENDED AND DISCUSSION ITEMS**  
(While encouraged, items below are not VSC requirements)

| Item                                         | Yes | No |
|----------------------------------------------|-----|----|
| I. Marine Radio                              |     |    |
| II. Dewatering Device & Backup               |     |    |
| III. Mounted Fire Extinguishers              |     |    |
| IV. Anchor & Line for Area                   |     |    |
| V. First Aid and PTW Kits (**over)           |     |    |
| VI. Inland Visual Distress Signals           |     |    |
| VII. Capacity/Certificate of Compliance      |     |    |
| VIII. Discussion Items: as applies           |     |    |
| a. Accident Reporting - Owner Responsibility |     |    |
| b. Offshore Operations                       |     |    |
| c. Nautical Charts / Navigation Aids         |     |    |
| d. Survival Tips / First Aid                 |     |    |
| e. Fueling / Fuel Management                 |     |    |
| f. Float Plan / Weather & Sea Conditions     |     |    |
| g. Insurance Considerations                  |     |    |
| h. Boating Check List                        |     |    |
| i. Safe Boating Classes                      |     |    |
| j. Maritime Domain Awareness                 |     |    |

I certify that I have personally examined this vessel and find it meets the above requirements at the time of this Vessel Safety Check. I am a qualified Vessel Examiner of the: CGAUX  USPS  State of \_\_\_\_\_  or \_\_\_\_\_

Printed Name of the Examiner: Yvonne Scoush Examiner Number: 120819

Examiner Signature: [Signature] Telephone Number: 304-533-7966

Additional Comments: This is not an official boarding for law enforcement purposes. It is recommended that you correct any deficiencies noted. This checklist is furnished for your information. There is no assumption of liability of any kind for advice given or opinions expressed in connection to this examination. By accepting the Vessel Safety Check decal you are pledging to maintain your boat and equipment to the standard of safety exhibited during this examination. Please remove the Vessel Safety Check decal if the boat is sold or no longer meets these requirements.

I am consenting to this Vessel Safety Check of my watercraft with full knowledge that it is provided to me as a public service on a volunteer basis without cost, and I understand and agree that my receipt of a Vessel Safety Check shall not constitute or be construed as a warranty or guarantee as to either the qualification, knowledge, or skills of the operator; the seaworthiness of the vessel; or the serviceability or adequacy of any equipment on board.

Owner/Operator Signature: [Signature] Date: 2/20/17

ANSC7012 (3-05) Previous edition may be used

Figure 3: "Vessel Safety Check" Job Aid Example

### **3. Methodology**

This chapter describes the research objectives for our project and outlines the methods for gathering information related to these objectives. The three primary objectives were identifying priorities and regulations that the USCG has for VIDA enforcement, establishing the relevant criteria for our job aid design, and compiling this information to test and refine our job aid. We accomplished this by utilizing a variety of different methods, including but not limited to, conducting interviews with Coast Guard inspectors and officers, conducting site visits along the East Coast, and gathering feedback from Coast Guard personnel about our job aid design.

#### **3.1 Overview**

In order to develop a job aid that is useful to inspectors, we gathered direct input from Coast Guard employees: specifically input from those with firsthand experience inspecting vessels. There are four primary areas where information was gathered:

- 1) What are the specific discharge regulations outlined in VIDA?
- 2) What are some examples of Coast Guard job aids that are currently used?
- 3) What procedures do USCG inspectors currently follow?
- 4) What qualities and characteristics did Coast Guard personnel want in a job aid?

This information established the criteria of a useful job aid in four ways. First, it informed the team about what the Coast Guard requires and expects from a job aid. Second, the everyday implementation of the job aid can reveal varying requirements and affected the design criteria. Third, information generated from ongoing interactions with Coast Guard personnel were used to iterate the design of the job aid. Finally, the analysis of the information determined what features are most important to include in the job aid.

Figure 4, shown below, illustrates the design process that the team used to design the job aid. This figure follows a typical engineering design process (O'Toole, 2018). The process, following an iterative method, identifies the problem or problems and develops a solution. Evaluation of the solution determines what further changes should be made, initiating the process again. A possible template design for a job aid and what it will include was developed each time the process is used. Each design was evaluated by both the team and by Coast Guard personnel. Once a design was determined to be viable, the process was complete and final edits to the design were made.

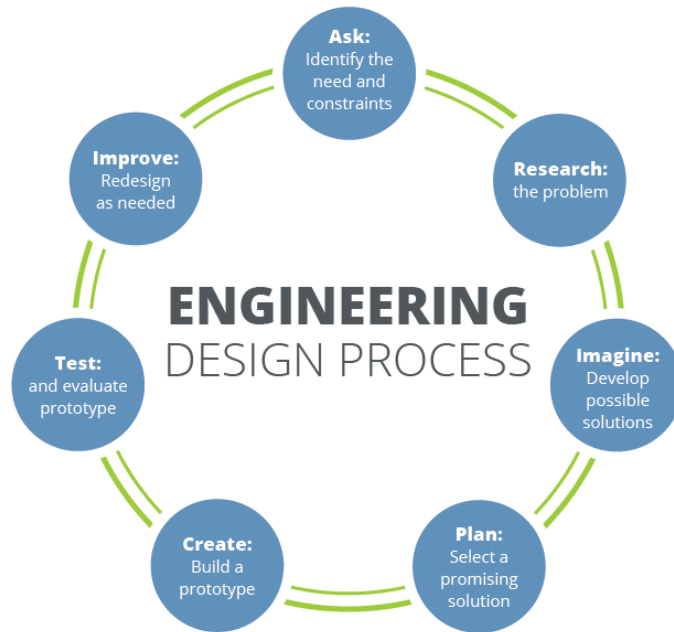


Figure 4: Diagram of the Design Methodology for this Project (O’Toole, 2018)

### 3.2 Identifying USCG Priorities for VIDA Enforcement

In order to develop an effective job aid, the team looked into how job aids are currently utilized by the Coast Guard, specifically looking for information with regard to the conditions under which job aids are utilized. From this information, we wanted to determine:

- How job aids are used, if at all, throughout current or previous inspection processes.
- Characteristics from existing job aids related to format.
- The types of content included in the job aids.
- Anticipated inspection methods and procedures related to the new regulations.

To achieve these goals, we utilized a combination of methods including interviews and case studies. We conducted interviews with Coast Guard Headquarters (USCGHQ) personnel, as well as examiners in the field to brainstorm template ideas for job aids. We collected information about what characteristics to include in the job aids as well as what formats and styles to develop. As a structured interview may result in important information being lost due to strict question guidelines, these interviews were semi-structured in nature. This allowed for flexibility in both the questions and responses and allowed us to more deeply explore the responses given by the interviewees. The interviews were challenging at times due to varying perspectives between USCGHQ and inspectors in the field. We conducted interviews with both types of personnel to understand the perspectives of both sides and ultimately find a middle ground. For the interview outline, questions, and responses; please refer to Appendix A, as well as Appendices E, F, and G.

We also analyzed case studies of other job aids to determine what types of content and formats work most effectively. Specifically, we analyzed a number of currently implemented Coast Guard job aids in order to extract design elements and gain insight into how inspection protocols are developed into job aids. The Coast Guard provided sample job aids that are currently in circulation for us to explore how inspection procedures are implemented into job aids. While these case studies may not have related exactly to our project, they helped us understand what visual design to use for our job aid, the complexity or simplicity that a job aid should have, and the way in which inspection protocols are included.

### **3.3 Establishing Criteria for the VIDA Job Aids**

We also sought to determine the characteristics that make a successful Coast Guard job aid. The research suggests that a successful job aid is one that allows a task to be completed without confusion and without further instruction from supervisors and is designed to allow its user to complete their task in a safe and efficient manner. However, certain factors such as its desired accuracy and repeatability depend on the organization and application it is being designed for.

By analyzing VIDA legislation and interacting with Coast Guard personnel we determined a number of criteria for the job aid. We read through each discharge regulated by VIDA and codified them based on what inspectors would be able to check for. We also interviewed Coast Guard personnel that were inspectors previously. Doing so helped us gain insight into what an inspector would like to see from a VIDA job aid. In addition, as many of the substances regulated by VIDA are potentially harmful to humans, shadowing an examiner showed the safety considerations that were included in the job aid. By speaking with former inspectors, we gained information regarding how much time it will take to complete an inspection, which allowed us to take into account conciseness of the job aid.

Understanding how the inspectors wanted the job aid to be structured was a primary consideration in designing a useful job aid. Information regarding these qualitative requirements were again collected through multiple methods. The first method was direct interviews with Coast Guard personnel. They were conducted in the same manner and under the same conditions as mentioned in Section 3.2. Through these interviews we sought to gather information regarding the following job aid criteria,

- Reference materials.
- Procedures and instructions.
- Visual aids.
- Design and content.

The project team also made a series of site visits to various Coast Guard affiliated locations. These locations included Baltimore, Hampton Roads, and Yorktown. The objective was to observe and analyze various job aids under real world operating conditions. Additionally, information related to the current inspection procedures was obtained by shadowing examiners during their inspection. At Baltimore and Hampton Roads it was about shadowing inspectors and

seeing the inspection process from beginning to end. We were also able to see different systems that these regulations entailed. At Yorktown, we were able to bring our job aids and gain feedback from various training officers and former inspectors. This information helped refine the job aids designs and determine its operating conditions. It also highlighted what makes certain job aids more viable than others (Berg, pg. 109, 2009).

### **3.4 Testing and Refining the Job Aids**

After the first job aid draft was complete, we looked to gain feedback from various inspectors on site visits and Coast Guard personnel at USCGHQ. From the inspectors, we gained a better understanding of the current procedures that they follow and gained insight on what types of information inspectors would understand. From USCGHQ personnel, we were able to determine what information was most important to include in each job aid, and we learned more background information surrounding the job aids, including ideas on future implementation protocols or modifications to VIDA.

This feedback is very important for the creation of these job aids. One reason is that these job aids have to be time-efficient and easy to use for the inspectors to be successful. If we did not ask for feedback, the inspectors may not be able to or will be unwilling to use our job aids because they are either too confusing or too similar to what they already do. In addition, as we are not inspectors, certain procedures may be unknown to us, so gaining feedback from both current and former inspectors will allow us to include those procedures in the job aids. Finally, by understanding ideas on future USCG procedures, we can make these job aids more adaptable and implementable for USCGHQ and USCG inspectors.

We utilized this feedback to develop multiple new iterations, each more refined than the last. We continued to revise and critique the design until a “final” version was created. In the future, this version can be beta tested in the field and modified to fit any changes the inspectors deem necessary.

We also used site visits described in Section 3.3 as tests for the prototypes of our job aids. The main purpose of these visits were to put the job aid into the hands of current and past inspectors and gain feedback on them to further improve them. This feedback was used to determine the pros and cons of each job aid, regarding both content and format, and to see where information was missing. We were also able to compare the procedures included in these prototypes with procedures that port state control examiners currently follow, in order to prevent redundancy. This influenced the format of the job aid in multiple ways, including determining whether the job aid will be digital or hard copy or whether the job aid is a checklist, Excel spreadsheet program, or visual aid. As a note, these decisions were influenced by time constraints and missing/withheld information. One notable concern is that our job aids are specifically applicable to VIDA. Since current Port State Control Examiners are not familiar with VIDA in any way, their understanding of the contents is limited. However, it is their experience with previous job aids and inspection procedures that made the site visits useful.



## 4. Job Aid Designs

In this chapter, we discuss the characteristics that we determined to be most important to the design of VIDA Job Aids. We first discuss the two types of specifications and the reasoning behind the decision to include them. We then present prototype designs and discuss how they conform to the criteria that we identified.

### 4.1 Key Content of VIDA and Inspections

Our exploration of the VIDA legislation identified the specific regulatory information that we determined should be included in the designs. We present the three major criteria related to the systems and discharges that we identified: purpose statements, the particular standards set by the regulations, and specific inspection types required by the regulations.

Purpose Statements: Purpose statements are included in the job aid designs to provide a logical rationale for performing the specific inspection. These statements, as seen in Figure 5, are about one sentence in length and are included in some capacity on every job aid under the title. According to the office of Operating and Environmental Standards (OES), including a reason to put in the added effort and additional time would be beneficial to inspectors. Inspectors currently spend about four hours on each vessel to inspect it under current protocols (see Appendix E). The implementation of VIDA is expected to increase this timeframe significantly. The inclusion of these statements encourages the inspectors to perform the examinations to the best of their ability.

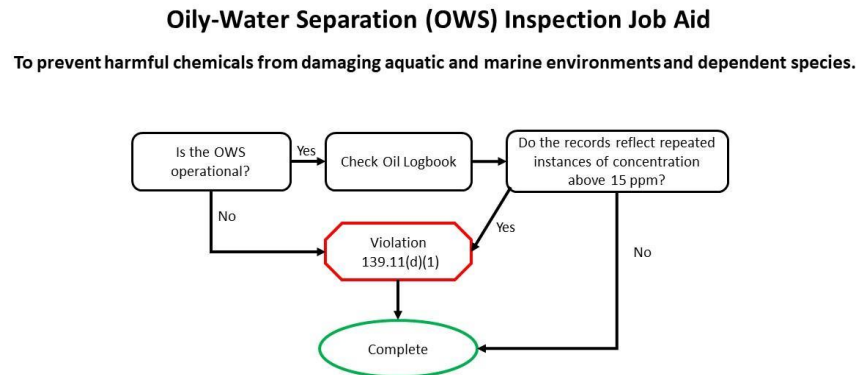


Figure 5: Oily-Water Separator Job Aid outlining the purpose statement

Standards: OES personnel reported that the regulations and standards should be simplified as much as possible to help the inspector understand the information, while also maintaining the necessary substance to perform the inspections effectively. Therefore, the specific regulations including inspection procedures and protocols, relevant reference materials, and the specific numeric or non-numeric standards are included in the designs. Due to the extensive length of

current inspections and the anticipated expansion due to VIDA, the inspections need to be as practical and efficient as possible. To address this, the regulations and standards were condensed into as concise a form as possible to explain them efficiently while also maintaining completeness and accuracy.

**Inspection Methods:** We have determined there to be three possible inspection methods depending on the particular discharge regulation. According to inspectors, the different methods for inspection could be a visual inspection of a system, a record check of log books, or a combination of the two (See Appendix E). These possibilities are reflected by three different designs of the job aids. Some are flow charts, others are tables or matrices, and some are hybrids of the two. The flow chart design is used for visual inspections due to its simplicity and use of a binary decision system. This is helpful to inspectors to relate what they are seeing to a clear pass/fail decision. When inspectors need to perform a records check of the log books, a table format is more appropriate. This allows inspectors to document numerical values and record whether all components of the required recordkeeping are present. Inspectors are able to easily check off that the vessel contains a certain record or is compliant with a specific standard. The third design is a hybrid of both the table and the flow chart. These are used for systems that require records to be checked and a visual inspection to be performed. As an example, the Biofouling Management Job Aid (Figure 4.1) includes checklist tables as well as a flow chart element to facilitate the examination and the records check. An Inspection Types Table detailing the type of inspection associated with each discharge can be found in Appendix C.

### **Biofouling Management Job Aid**

**To reduce the introduction of invasive species which can outcompete and eliminate native species, irrevocably altering ecosystems.**

Vessel MUST provide a full **Record of Biofouling Management Practices upon request**. Records must include/consider each of the elements listed in the table below, as directed by **USCG Implementation<sup>1</sup>**.

| Requirement                                           | Info                                                                                                                             | Included | Missing | Examiner Notes |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------|---------|----------------|
| Vessel Operating Profile                              |                                                                                                                                  |          |         |                |
| Anti-Fouling System Details and Operational Practices | Installation Date and Location, Coating Areas, System Maintenance, Operation, and Recommendations, Supplies/Chemicals Used       |          |         |                |
| Areas Susceptible to Biofouling                       | Including Niche Areas, Cathodic Protection                                                                                       |          |         |                |
| Schedule/Plan for Inspections/Maintenance/Renewal     | Including Dry Dock and Cleaning, Biofouling Removal Measures, Any Systems Repairs or Renewal                                     |          |         |                |
| Waste Disposal Procedures                             | Biological Waste from System, Dates and Location                                                                                 |          |         |                |
| Process for Recordkeeping of Operation/Maintenance    | Records of Anti-Fouling Systems and Internal Seawater Cooling Systems: Dates and Location, Results, Any Corrective Actions Taken |          |         |                |
| Contingency Measures for System Failure               | e.g. Freshwater Flushing, Chemical Dosing                                                                                        |          |         |                |

<sup>1</sup>Implementation plan TBD. Requirements listed are temporary placeholders derived from MEPC 207.62 as directed by IMO.

## Biofouling Management Job Aid Continued

To reduce the introduction of invasive species which can outcompete and eliminate native species, irrevocably altering ecosystems.

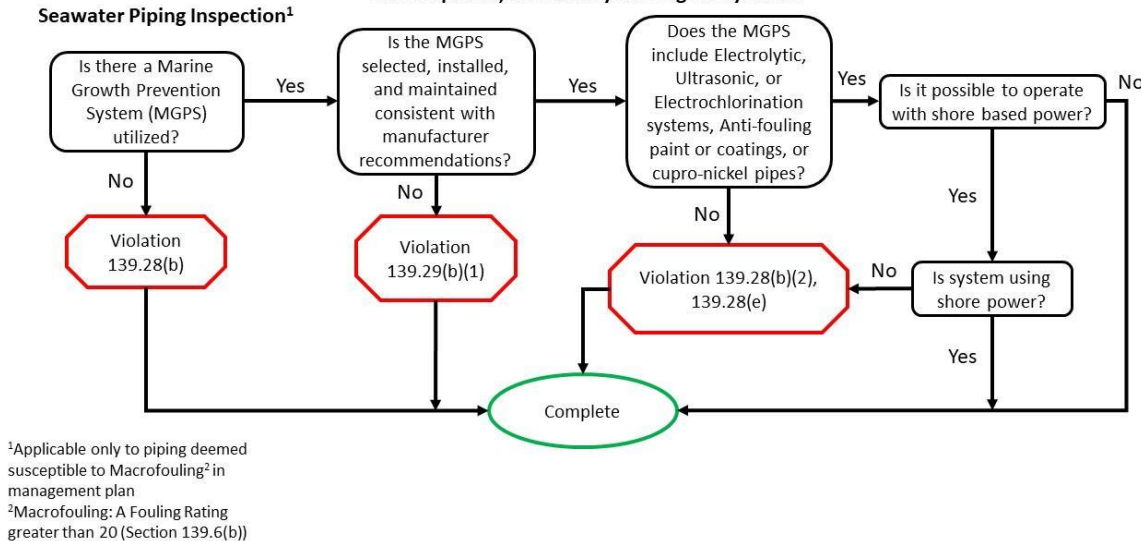


Figure 6: Biofouling Management Job Aid utilizing both inspection types. The table relates to the inspection of the Biofouling Management Plan that must be kept in the ship's record books. The flow chart related to the visual inspection of biofouling management systems on board.

## 4.2 Design Criteria for VIDA Job Aids

In this section, we describe three criteria that guided the design of the VIDA job aids:

- Enforceability
- Simplicity
- Consistency

### 4.2.1 Enforceability

Many of the regulations within VIDA are difficult to enforce based on the available technology, time constraints, and general feasibility. Therefore, the enforceability of the regulations was an important aspect of the designs. We used a binary system whenever possible to simplify the inspections and make clear what constitutes a violation or deficiency. Binary describes a decision with two possible outcomes. The ability to quickly determine compliance was particularly important to Coast Guard personnel who have inspected vessels in the past (See Appendix E); the binary system addressed this concern. Some of the regulations were so vague that they qualify as Best Management Practices (BMPs). An example is VIDA Section 139.11(c)(1), which states “Discharge of bilge water must [B]e minimized by operating a drier bilge”. In this instance, “minimized” is not specifically defined, making enforcement challenging. These regulations based on BMPs are particularly difficult to enforce because there is no defined condition at which the discharge can be determined as compliant or in violation. In these cases, there is little enforceable content within the regulations. Therefore, we relied on

predictions of future USCG implementation policies. These anticipated policies would specify how to enforce the BMPs in the future and we used them to guide the development of the job aids.

#### *4.2.2 Simplicity*

In order to decrease the time of completion for an inspection and decrease the extra effort needed by inspectors, brevity and ease of use are both criteria for each job aid. The inspectors do not want to spend all day aboard one vessel nor do they have the time to. We tried to make checking each system or discharge as efficient as possible using easy to follow flow charts and arrows to create step by step instructions. Based on inspector and general administrative feedback, the flow chart design allows for inspectors to quickly reach a conclusion. Furthermore, the idea of a binary system as described in the previous section was preferred. We also found that having multiple pages for one discharge was not practical. Many personnel are averse to flipping through multiple pages to find what they need (See Appendix F). Therefore the designs are as concise as possible, mostly keeping information to one page.

#### *4.2.3 Consistency*

The set of job aids should have consistent formatting across all of them for the user to not get distracted or confused visually. Inspectors reported that when flipping through the pages and seeing job aid after job aid, consistency is much easier on the eye (See Appendix F). Therefore, the font, color schemes, wording, and layout of all tables and charts remained relatively similar throughout the set of job aids. The color scheme of using outlined boxes for actions is used in every single job aid, from flow charts to decision tables. For simplicity, red is used for a violation, green is used for completion or compliance, and yellow is used to redirect to another job aid.

### **4.3 Final Designs**

Utilizing the content mentioned in Section 4.1, and the criteria described in Section 4.2, we created a series of job aids that can be used by US Coast Guard inspectors to inspect vessels for compliance with VIDA. The content of these job aids reflects the draft VIDA regulations we received from the USCG, while the format was influenced by the criteria we determined to be most important through interviews and site visits. Consequently, the exact design of each job aid varies somewhat, with certain designs favoring some criteria over others. A few examples of different job aid formats are explained below.

4.3.1 Flow Chart Job Aids

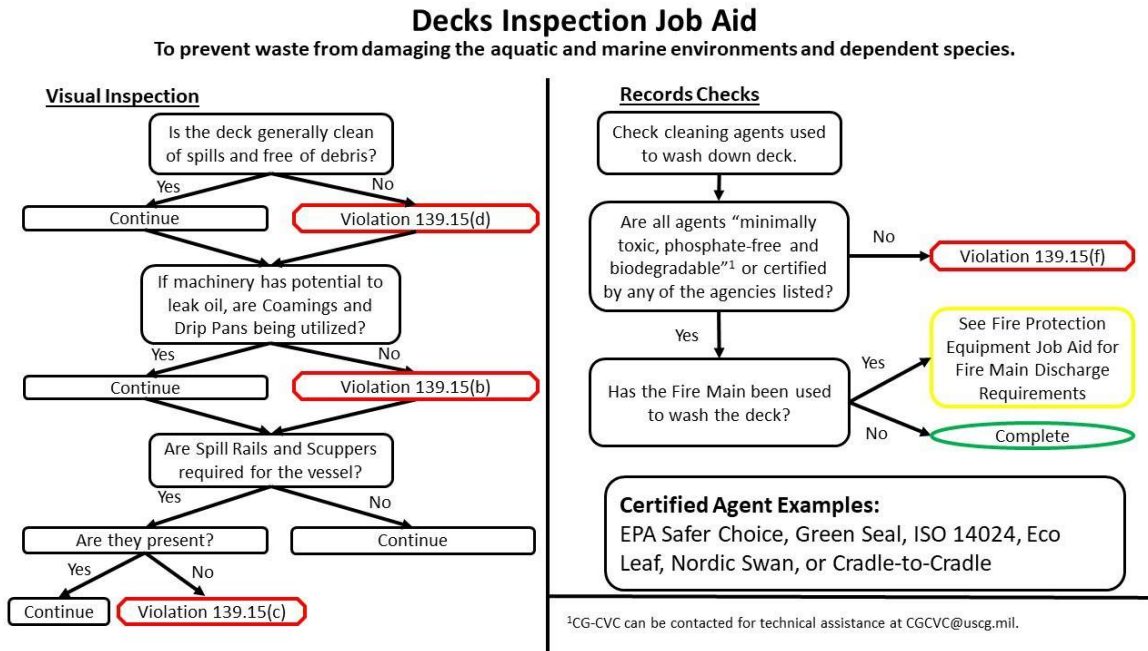


Figure 6: Decks Inspection Job Aid, which is an example of a flow chart job aid.

One of the more extensive job aids, the Decks Inspection Job Aid, shown in Figure 6, represents one of the major job aid types: the flow chart. It utilizes a variety of techniques, such as arrows, color coding, and short sentences to communicate the information found in VIDA into a visual medium. Compared to a written manual or verbal instructions, a visual aid such as this makes it easier for an inspector to understand and execute the information described in it. This job aid also utilizes a binary system throughout, which removes any potential ambiguity through “judgement calls,” and makes it easier to note compliance or a violation. This also makes these regulations more enforceable, with more ambiguous and subjective information removed or modified to fit a binary structure. Finally, we included a purpose statement at the top of the job aid, designed to tell the inspectors why this particular inspection is important. As this will be the first time USCG inspectors have to perform these examinations, not giving them a reason may lead some inspectors to skip these checks, which can cause a substantial environmental impact over time.

4.3.2 Table Job Aids

|                            |                                                                                                     |     |                     |
|----------------------------|-----------------------------------------------------------------------------------------------------|-----|---------------------|
| <b>Boilers/Economizers</b> | Are there records that any boiler or economizer has undergone maintenance resulting in a discharge? | Yes | Continue            |
|                            |                                                                                                     | No  | Complete            |
|                            | Do onboard records indicate that this effluent has been retained and not discharged?                | Yes | Continue            |
|                            |                                                                                                     | No  | Violation 139.12(b) |
|                            | Is water from hydrostatic testing being discharged?                                                 | Yes | Violation 139.12(c) |
|                            |                                                                                                     | No  | Complete            |

*Figure 7: Boiler/Economizers Job Aid, which is an example of a decision table job aid. This is part of a group of job aids that fall under the same purpose statement.*

Another type of job aid we created, the table, can be represented by the Boiler/Economizers Job Aid, shown in Figure 7. Figure 7 in particular is designed as a decision table, which uses a binary system to check for compliance. Inspectors avoid judgement calls on regulations and can clearly understand what is allowed and what is not. We did not use a flow chart here due to the extremely limited amount of information, which could either confuse the inspectors or cause them to accidentally overlook this check. We listed out the specific violations in VIDA that each check relates to, which they can use as reference material to understand the regulations better. In addition, any violations or other information can be recorded in the inspection notes. This adds a level of transparency and can be used to inform the vessels of their specific compliance violations. This could potentially limit future violations by educating vessels in the contents of VIDA. As a note, this table also has a purpose statement, but as it represents all of the smaller tables collectively, it is not included in Figure 7.

### 4.3.3 Hybrid Job Aids

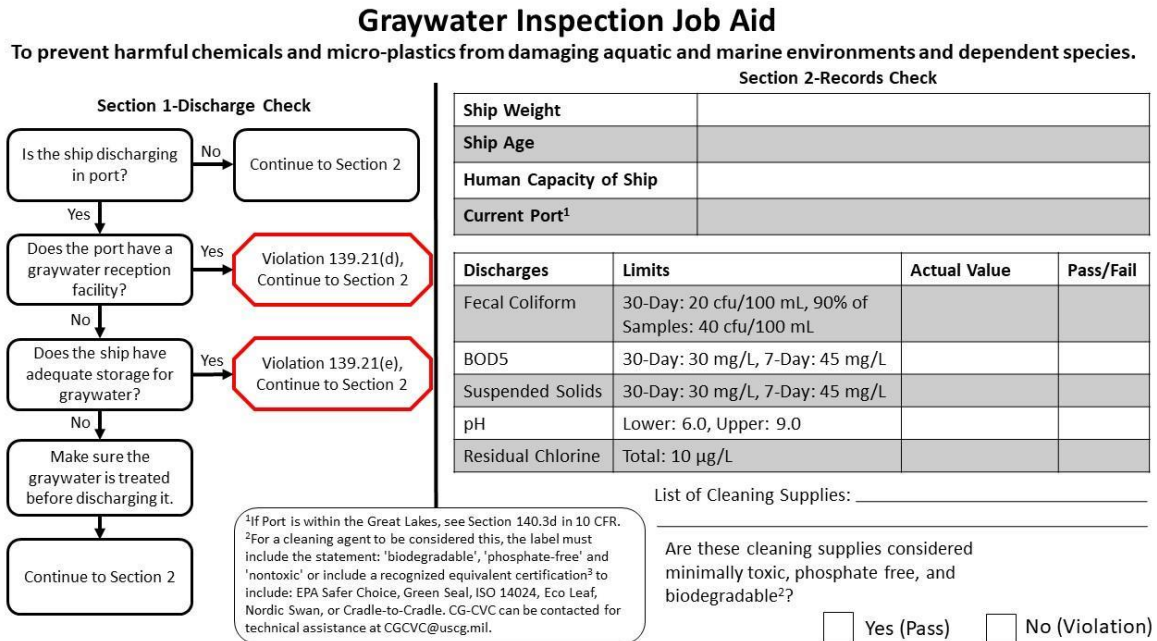


Figure 8: Graywater Job Aid, which is an example of a hybrid job aid.

The Graywater Job Aid, shown in Figure 8, utilizes a combination of design ideas from both flow charts and tables. For the parts of the inspection that require a binary system, we used a flow chart as it communicates this information with fewer words. For the parts that require the inspectors to record or read information, we decided to use a table. These tables list a group of discharge particulates or components and their associated limits, which allows a comparison between the actual value and the limits set out in the table. It is then simple to determine and note whether the ship complies with these limits. This is a very simple recording system that inspectors should understand and be able to implement. This job aid is also very efficient, as it includes all of this information on one page, which prevents inspectors from having to flip through multiple pages to complete one job. Finally, this job aid also lists a series of approved cleaning agent certifications that inspectors can check for, which saves the inspector's time when checking for compliance, as they do not have to check with Coast Guard HQ every time they come across one. This can save time during vessel inspections and can prevent ambiguity in these types of checks.

These job aids are a representative sample of the overall set that covers all of the VIDA discharges. They were created using draft legislation prior to the development of enforcement or implementation procedures. The regulations established in VIDA and the inspection implementations are therefore likely to change, which will require future changes to these designs. The entire set of job aids we created can be found in Appendix H.

## ***5. Recommendations and Conclusions***

The set of job aids shown in Appendix H are designed to assist examiners with commercial shipping inspections. These job aids aim to help inspectors better enforce environmental standards consistent with VIDA, while also making their inspections more time efficient and simpler to perform. In this section, we will discuss the specifications and criteria that we suggest the Coast Guard use in future job aids they create, how the Coast Guard can implement these job aids into their current inspections, how the Coast Guard can modify these job aids to fit future versions of VIDA and related environmental standards, and how these job aids can be implemented in the field.

### **5.1 Job Aid Specifications**

As explained in Chapter 4, we determined that there are several specifications that a viable job aid contains. We recommend that they be included in future job aids for VIDA. They include:

- Consistency- Each job aid has similar fonts, color schemes, terminology, and format.
- Enforceability- Job aids use a binary decision process, eliminating as much interpretation as possible. This makes clear what constitutes a violation or deficiency and allows for easy enforcement.
- Simplicity- The concise format and simple structure allow for quick use during the small time frames available to examiners during vessel inspections.
- Inspection Methods- The overall style of each individual job aid was largely determined by the type of inspection method that is needed. A flow chart would be used for visual inspections, a table for records checks, and a hybrid of a flow chart and table for both types of inspections.
- Purpose Statements- Each job aid includes a purpose statement elaborating on the reasons for the regulation and the need for conducting the inspection.
- Standards- The specific regulations within VIDA are condensed and inserted into the job aid designs. This is particularly the case for the flow charts, where the standards of the regulations have been framed into binary response questions for simplicity.

Additionally, although we chose these specifications for VIDA specifically, they are likely applicable to other regulations moving forward. We suggest the Coast Guard consider these same specifications, or similar ones, when developing any future regulatory job aids.

### **5.2 VIDA Implementation Protocols**

The Coast Guard has yet to establish its implementation of VIDA. Therefore, many of the job aids designs that we developed are based on assumptions related to the predicted implementation strategy of each discharge. This is especially true for records checks, since the process of recordkeeping is not yet established for most of the discharges. We recommend that



the implementation strategy for VIDA include specific processes and standards for maintaining self-monitoring records. Additionally, we recommend establishing clear and distinct methods of determining compliance, particularly if the regulation is a best management practice.

While VIDA lays out all of the environmental regulations that commercial vessels must follow and states that the Coast Guard must regulate them, there is nowhere within VIDA that states that vessels must self-monitor these discharges. In addition, there is no standard process of recordkeeping established in VIDA. However, standards for some of these discharges can be found in the regulation that preceded VIDA, the Vessel General Permit (VGP). As such, we recommend that the Coast Guard create a series of self-monitoring regulations based on those found in the VGP and instruct vessels to follow them. These self-monitored records would be instrumental in establishing a vessel's ongoing compliance with the regulations, as the Coast Guard would gain the ability to check the exact time and quantity of each vessel discharge.

As VIDA is a set of environmental regulations and not a set of implementation requirements, some of the regulations included within it cannot be accurately or practically inspected for. Examples of this include Cathodic Protection, which inspectors will never be able to check due to its location under the ship, and Refrigerator and A/C Condensate, which could be discharged at sea without the inspectors knowing, even though VIDA states it can never be discharged. Many of these regulations can be considered as best management practices, or BMPs. This means that the vessel should take responsibility for following the regulations even when inspectors cannot check for it. We suggest that the Coast Guard, to the best of its ability, eliminate these BMPs from their inspections. They can do this by either removing these types of checks altogether or by framing any BMPs as some form of log checks within the job aids, even if they cannot inspect the system itself.

### **5.3 Job Aid Adaptability**

Since the regulations in VIDA are not finalized, and many of the exact inspection procedures are not yet created, we suggest that the Coast Guard also design these job aids, and any future ones, to be modifiable and adaptable. This means that these job aids should be designed in a way that, while the content inside may change, the style and format of each job aid stays very similar to the original version. This will prevent confusion for inspectors as they get updated job aids, and it will make the Coast Guard's job easier as they only have to replace the information included within a job aid. In order to achieve this, we recommend that these job aids serve as templates and be designed to allow for easy changes to be made consistent with potential changes to the regulations. Their initial versions can be used as a baseline and later be made official once the regulations are finalized.

Even after the regulations are finalized, these job aids should be open to modification based on inspector feedback. USCG inspector trainers stated that when job aids are initially sent out in the field, they are usually beta tested by a small group of experienced inspectors. After about five tests, they come back to the trainers and give them feedback on what worked and what

did not. These modifications are invaluable, as they come directly from a group who both the most familiar with these procedures and regulations and will use these aids the most.

#### **5.4 Job Aid Implementation**

Once the US Coast Guard receives the finalized VIDA regulations and releases their own inspection procedures and self-monitoring regulations, they will need to implement these job aids into vessel inspections. To accomplish this, we recommend that the USCG utilize these job aids as reference material for both trainee and experienced inspectors as they complete their inspections. We also recommend that these job aids be designed in a way that they can easily be transferred to a digital medium.

During our site visit to Yorktown, some USCG inspectors stated that they tend to memorize their inspection procedures over time, which means that many of them would not need a job aid in front of them at all times. Also, these inspectors explained that once they have done a procedure multiple times without finding any violations or making any mistakes, they would be tempted to ignore any written material they have anyway. This means that a job aid for them may be used only if they either forget a specific step or when they come across a violation. As such, these job aids may be good materials for them to bring along in a backpack and not as their primary recording tool.

Inspection training officers also suggested that these job aids be transferable to a digital medium, such as a Word Document or PowerPoint. Recently, trainee USCG inspectors have begun to receive Microsoft Surface Pro tablets for use during inspections. They can use these tablets to both pull up reference material or even record data from each vessel. Having these VIDA job aids be accessible on tablets would make them more useful to inspectors, as they would both be easier to scan through and would be more convenient than paper copies.

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## ***Appendix A: Interview Structure for Port State Control Examiners***

*Hello, (introduction) our names are Samuel Winslow, Matthew Moreria, and Dexter Czuba, and we are a student team from Worcester Polytechnic Institute. We are working with the Coast Guard for our Junior year project. The Coast Guard has asked us to develop a job aid to assist in measuring discharges on/from commercial ships. To do this, we have been gathering information on the current regulations and procedures regarding these inspections. If you are willing, we would like to ask you a few questions about these procedures and allow you to express any opinions you may have. Your answers will be kept completely anonymous.*

- 1.) *This first question is just to get an idea of your experience inspecting vessels.*
  - a.) Do you currently or have you in the past performed commercial vessel inspections?
    - i.) (yes) How many vessel inspections have you overseen/completed?
  - b.) What is your opinion on the current state of vessel inspection procedures?
    - i.) Do you believe that they are clear?
    - ii.) Do you believe they are extensive enough?
    - iii.) Do you have any concerns about their accuracy?
- 2.) Are you familiar with the recently passed VIDA regulations?
  - a.) If so, what do you believe they entail? Do you understand the VIDA?
  - b.) Do you believe they will influence your current procedures in any way?
- 3.) Do you currently use a job aid for your inspections?
  - a.) If so, what is the overall design like?
    - i.) Is this design effective?
    - ii.) What do you think could be improved about it?
  - b.) If not, have you used any job aids in the past?
    - i.) If so, in your opinion/from your experience, what information does an effective job aid provide?
    - ii.) If not, do you feel you could benefit from a job aid? Why or why not?
- 4.) If you believe a job aid would benefit you, what type of job aid would you prefer? A checklist? A manual? A measuring device? A computer program?

## *Appendix B: Effluents List*

|                              |                                         |
|------------------------------|-----------------------------------------|
| Biofouling Management        | Gas Turbines                            |
| Oil and Fuel                 | Graywater Systems                       |
| Bilges                       | Hulls and Associated Niche Areas        |
| Boilers/Economizers          | Inert Gas Scrubber System               |
| Cathodic Protection          | Motor Gasoline and Compensating Systems |
| Chain Lockers                | Non-Oily Machinery                      |
| Decks                        | Pools and Spas                          |
| Desalination Systems         | Refrigeration and Air Conditioning      |
| Elevator Pits                | Seawater Piping                         |
| Exhaust Gas Cleaning Systems | Sonar Domes                             |
| Fire Protection Equipment    |                                         |

### *Appendix C: Inspection Types Table*

| <b>Discharge/System</b>                 | <b>Inspection Type (Flow Chart, Table, Hybrid)</b> |
|-----------------------------------------|----------------------------------------------------|
| Biofouling Management                   | Hybrid                                             |
| Oil and Fuel                            | Flow Chart                                         |
| Bilges                                  | Flow Chart                                         |
| Boilers/Economizers                     | Table                                              |
| Cathodic Protection                     | Table                                              |
| Chain Lockers                           | Flow Chart                                         |
| Decks                                   | Flow Chart                                         |
| Desalination Systems                    | Table                                              |
| Elevator Pits                           | Table                                              |
| Exhaust Gas Cleaning Systems            | Flow Chart                                         |
| Fire Protection Equipment               | Flow Chart                                         |
| Gas Turbines                            | Table                                              |
| Graywater Systems                       | Hybrid                                             |
| Hulls and Associated Niche Areas        | Hybrid                                             |
| Inert Gas Scrubber System               | Table                                              |
| Motor Gasoline and Compensating Systems | Table                                              |
| Non-Oily Machinery                      | Table                                              |
| Pools and Spas                          | Table                                              |
| Refrigeration and Air Conditioning      | Table                                              |
| Seawater Piping                         | Hybrid                                             |
| Sonar Domes                             | Table                                              |

***Appendix D: Interview Notes - Coast Guard Officer and Former Inspector in  
Operating and Environmental Standards Division at USCGHQ***

*United States Coast Guard Job Aid*

*Interview 2*

*30 October 2019*

*Matthew Moreira (Scribe), Samuel Winslow (Interviewer), Dexter Czuba*

*Lieutenant working in regulations with past experience in port state examinations (Interviewee)*

**Q1.)** When you go onto a vessel for an inspection, what is the first thing you do?

A1.) The first thing before even getting on the ship is to check the Vessel General page in MISLE and learn as much information about the vessel as possible, so when you get to the vessel you can immediately begin inspection. The first thing when arriving is doing a walk through around the hull of the ship checking for paint issues and deformities.

**Q2.)** Are there requirements in VIDA or related to VIDA that require ships to maintain logs or records of self-maintenance/monitoring?

A2.) There is nothing examiners have to check for in terms of self-monitoring of the ship, but it is expected that the crew keeps logs and records of what they did on board and the different cleaning procedures and discharges out at sea. It is not required for inspectors to reprimand them if they do not have precise records however. It's a very surface level check of these records. More so that they just have them not what is in them.

**Q3.)** Between the different classes of ships, how significantly do the inspections change? Can there be differences in what systems there are or can the inspection for the same system change across ships?

A3.) The length of the inspection and number of inspectors varies based on the type of ship but the inspection process is standardized as a whole, no matter the ship. If they do not have a certain system it is just not applicable. The difference is between inspecting a foreign vessel versus a domestic vessel. Foreign vessels are inherently less lengthy and more of an overall check due to the vessel being checked by several port authorities along its route, including its own flag state. Domestic vessels are much lengthier and in depth while also requiring a larger number of inspectors, since we are the flag state for these vessels.

**Q4.)** What is the time frame for a vessel inspection?

A4.) Once again this depends on the type of vessel and whether or not it is a domestic vessel or a foreign vessel. Domestic vessels usually take a little longer but have more man power when it comes to inspectors. While smaller vessels may take less time. Usually a vessel inspection requires checking both the safety check and security check. So, on average, it would be about 4 to 5 hours for both domestic and foreign inspections.



**Q5.)** Is there a difference between port state control officers and inspectors?

A5.) They are one in the same. Port state control officers is the official name given by the Coast Guard.

**Q6.)** What systems/discharges have existing data in the MISLE database?

A6.) MISLE has two major parts. The Vessel General Page which contains information about the specifics of the vessel itself (size, age, design, etc.). Then there is the Inspection Page which contains the information about deficiencies of the ship, if any, by system and subsystem. If an inspector finds deficiencies within a certain system they will be able to input the information into the database once the inspection is completed. Main thing is to check if a vessel has a long history of deficiencies with a certain system. This information should and can be accessed before an examiner even goes to the vessel to inspect it.

**Q7.)** Have you ever used the Ballast Water Management Job Aid or other job aids during an inspection?

A7.) I have not used the BWMS job aid since it is relatively new, however, there is a job aid for the entire inspection procedure and that is used mostly when you are training and when trainees come aboard to inspect ships. It is the same procedure every time so once you get used to it and receive your examiners certificate and complete training you do not use it again nor need it.

**Q8.)** Are there any enforcement procedures related to a violation from the VGP or VIDA?

A8.) Not necessarily, the procedure for a violation is mostly taking note of the violation and letting a liaison to the EPA know that there were violations on board and the information goes to the EPA. However, like I said if we find infractions we will put the discrepancies in MISLE information system.

**Q9.)** On the PSCE Job Aid, it has 102 check boxes and only one is related to the VGP, how does the inspection process handle this check box currently?

A9.) Examiners will just check that the vessel has a VGP and it has been approved and is valid. They do not check for the specific contents within the VGP.

**Q10.)** Our design for the discharge job aids is one that has flowcharts and more of a binary system of yes and no. Do you believe this would be a good idea as a design given your experience?

A10.) Yes that design seems great. Since this is new to everyone it has to be general for trainees and experienced examiners alike. But doing a quick walkthrough of these systems it would be very beneficial to keep things simple and easy to follow with a flow chart. Also seeing in the flow chart what exactly violations are when it comes to these systems is very beneficial as well.

*Note: The names and divisions mentioned in the interview have been omitted in order to maintain anonymity in compliance with WPI IRB policy*

***Appendix E: Interview Notes - Coast Guard Officer and Former Inspector in  
Commercial Vessel Compliance Division at USCGHQ***

*United States Coast Guard Job Aid*

*Interview 3*

*1 November 2019*

*Dexter Czuba, Matthew Moreira (Scribe), Samuel Winslow (Interviewer)*

*Lieutenant Commander working in Commercial Vessel Compliance {CVC} with experience in port state control examinations (Interviewee)*

**Q1.)** How is MISLE accessed?

A1.) MISLE is a database available at the port state control centers that a screener would access before a vessel arrives in port. An inspector could also access this before they leave to start their examinations for the day. This does not happen often however due to the time constraints examiners are under.

**Q2.)** How do you input data related to infractions into MISLE?

A2.) After an examination is concluded the examiner would, at the end of the day, input citations into the tab “Activity history” which would be where examiners could find the history of the vessel to see if it has been cited before or if it has been detained before. Also, with the upcoming VIDA regulations being put into place, it would be a good idea for examiners to put any non-compliant system notes into the tab named “Special Notes” which would be able to keep records of which systems are discharging or any violations for the next inspector to know before they go aboard.

**Q3.)** VIDA does not have any requirements pertaining to self-monitoring and record-keeping like the VGP, will self-monitoring be implemented by the Coast Guard enforcement?

A3.) I can’t really speak upon what the Coast Guard wants or where the implementation is going. However, I can give my own opinion. The Coast Guard should eventually enforce an Environmental Management System (EMS) much like the already existing Safety Management System (SMS). This would mean that the vessel crew would be responsible for maintaining and recording where and when they discharge. While also recording the discharges and making sure they are compliant with the VIDA regulations. The Coast Guard examiners would then go on board and check the vessels EMS making sure the plan covers all the regulations and all the bases and that the crew is well informed on the plan as well. If everything seems good, the examiners would then check a random system and see if it is compliant. If things seem off and are not going well they may expand their examination, asking to see other systems and discharges.

**Q4.)** Are there records for what the vessel discharges and when they discharge?

A4.) Currently there are no records for when or what the ship discharges, that would be included in the EMS in my opinion. There is also no information in MISLE about this either, it

would take a lot of man power and time to put a database in MISLE solely dedicated to specific discharges.

**Q5.)** Are there records for the movements of ships? When they are stopped/moored?

A5.) Every vessel needs to give a notice of arrival to the port. For domestic vessels this should happen at least 24 hours before departure. For foreign vessels this should happen at least 96 hours before departure. However, arrival and departure times and locations are all the information an examiner would be able to see. If the ship decided to anchor for a couple hours then no one would have any clue. There is a device called an AIS onboard which is the equivalent to a black box aboard a plane. This device needs to be turned on no matter what once a ship has entered U.S waters. However, the only time this is generally used by the Coast Guard is when an AOA has been issued. Only then would the Coast Guard be able to see the exact route and stopping time of the vessel, but an examiner could not know this during or before an inspection.

**Q6.)** How can you tell that there are discrepancies between system discharge and records kept onboard?

A6.) If the information on the ships records does not coincide with what inspectors actually see on board, then that would indicate a discrepancy. The easiest example is if the examiner does a surprise examination of a vessel and clearly sees ballast water discharge off the side in port. The inspector then goes on board the vessel and checks the records and if the records suggest that ballast water has not been discharged and is being stored then that clearly does not agree with what they are doing and therefore would incite an investigation into was it intentional and why would the captain lie or falsify records. Examiners generally have discretion over whether or not they feel they are being lied to, and if they believe they are then special investigations units will be notified to come onboard and do a very a thorough investigation.

**Q7.)** What are your thoughts on our preliminary job aid draft we had sent?

A7.) It is a great start, you guys are really moving quickly. I have a few suggestions. When things may become confusing for an inspector due to procedure or terminology try putting the definition in there or outlining the exact procedure of what they are supposed to do. I would keep these definitions to the same sheet as the specific diagram. I really like the layout and flow of fire protection equipment. I would just recommend using consistency of terminology, sometimes you say violation and sometimes you say inspection failed. For the EAL box in Oil and Fuel, I would list out some of the most noticeable EALs instead of just giving a definition. I would keep pages front and back so that way the inspector is not flipping back and forth between lots of pages. I would also put the compliant checklist in the front, makes it easier to mark and make the table of contents integrated into this. Page 11 is a good template, black for regular and using green and red for continue and violation, used that for all the slides. Save colors like green and red to be made when there is a determination or conclusion made.

*Note: The names and divisions mentioned in the interview have been omitted in order to maintain anonymity in compliance with WPI IRB policy.*

***Appendix F: Interview Notes – Civilian Employee, Retired Captain and Former Inspector in Commercial Vessel Compliance Division at USCGHQ***

*United States Coast Guard Job Aid*

*Interview 4*

*13 November 2019*

*Dexter Czuba (Interviewer), Matthew Moreira (Scribe), Samuel Winslow (Interviewer)*

*Retired Captain working in Commercial Vessel Compliance {CVC} (Interviewee)*

**Q1.)** Do you have any advice or opinions on any of the job aids?

A1.) On the bilges job aid, maybe change the first block to in the slide, it is confusing whether or not this should be the starting point. The bilges is a bit too specific, very few vessels will discharge bilge water in port, and many do it underway. If the bilge water meets regulations of 15ppm then discharging it should not be a problem. Also, I would put a note saying that these regulations are based upon EPA VIDA regulations not current Coast Guard regulations. Maybe another footnote or series of footnotes detailing the exact code violation from VIDA or include the violation in the job aid.

**Q2.)** Is 15ppm a standard for only certain vessels? VIDA implies it is only applied to vessels over 400 gross tons.

A2.) The 15 ppm standard is applied to every vessel. Many vessels under 400 gross tons still use separators in their bilge water tanks to comply with the 15 ppm regulation. The 15ppm standard is not a new standard, it has been around for quite some time.

**Q3.)** Do the EPA and Coast Guard regulations divulge on bilges?

A3.) Yes, the EPA in VIDA states that the 15ppm should be met across vessels over 400 gross tons. The Coast Guard's current regulations state that any vessel discharging bilge water with a sheen is in violation, since if you are compliant with the 15ppm or below then there should not be a sheen anyway. Sheen is always a violation.

**Q4.)** What is meant by a "sheen hiding chemical" as stated in VIDA?

A4.) I have never heard of this terminology before, usually it is called dispersants. These dispersants are more likely than not some kind of dish soap.

**Q5.)** Are graywater regulations like bilge water regulations?

A5.) Graywater at the moment is a state to state regulated discharge. VIDA aims to take away this state regulation freedom and centralizes the regulations and delegates central enforcement to the Coast Guard. At the moment, without VIDA, states can still regulate and enforce in their own ways.

**Q6.)** How are inspections done for the EGCS system?

A6.) First it is a physical look around of the system. Seeing if there are any deformities or repairs made to the machine, if it is leaking anything, etc. Next you would look at the data collected from the digital monitoring system, it records data every 2-3 minutes. This data will

show alarms triggered when something is non-compliant. You would then proceed to see how often these alarms occur and talk to the captain or engineer to see what the protocol was for handling these alarms.

*Note: The names mentioned in the interview have been omitted in order to maintain anonymity in compliance with WPI IRB policy.*

***Appendix G: Interview Notes – Civilian Employee in Operating Environmental Standards Division at USCGHQ***

*United States Coast Guard Job Aid*

*Interview 1*

*23 October 2019*

*Matthew Moreira (Scribe), Samuel Winslow, Dexter Czuba (Interviewer)*

*CIV Employee in Regulations (Interviewee)*

**Q1.)** Are the highlighted parts currently in VIDA temporary? Should they be included, if they are subject to change, in any of the job aid designs?

A1.) The highlighted areas just mean that the EPA highlighted the lines for whatever reason, we are unsure on this as well. It may be that the highlights are to signify duplicate sections, but this is only an assumption. The first portion of highlighting could be references toward laws that are changed year to year (refer to Section 139.22-E). The second portion of highlighting just ignore (refer to Section 139.22-J-2(iii) as well as 139.22-K).

**Q2.)** How much are we allowed to explain/elaborate on information contained in VIDA?

A2.) There should not be anything that you cannot include. However, to be safe use a disclaimer at the end of the proposal saying that the draft of VIDA used is not official legislation and not meant for the public. Also, in addition to stating it is not official, maybe mention it will take a while to finalize the official draft.

**Q3.)** In VIDA, what is meant by “fouling rating”? Is this a calculation or something more qualitative?

A3.) In VIDA, “fouling rating”, unsure on its meaning. Maybe speak to some other Coast Guard personnel, they might know more. This relates to hulls, and at the moment a lot of the regulations on hulls are in flux and up in the air. Nothing is concrete at the moment, especially with hulls.

**Q4.)** “Treated” and “Untreated” are used several times in junction throughout VIDA, at what point does VIDA differentiate between the two?

A4.) The words treated and untreated, when referring to an action the crew should have taken, should be kept in the records of the ship. This makes an inspectors job easier since they receive the records of the ship ahead of time and they will be able to see right there if the ship has been treating in compliance with VIDA regulations. Some are measurements taken on board the ship, it varies between discharges.

**Q5.)** How does the exhaust gas cleaning system function with regard to pH level? (Section 139.18 - B - 1i in VIDA)

A5.) Bring this question to another member of the Coast Guard, they might know more about this particular section and the different acceptable levels of pH.

**Q6.)** In section 139.21-I-2 and I-3, what is meant by a suspended solid in this context? Also, what is BOD5?

A6.) I am not sure about what a suspended solid exactly is, but BOD5 stands for Biological Oxygen Demand. However, I am not sure what the 5 stands for at the end.

**Q7.)** Can you give any clarification into sections 139.22-F and 139.22-G? The TBT and Cybutryne regulations seem to contradict one another.

A7.) The TBT and Cybutryne regulations seem contradictory but it is because these paint coatings were allowed for year prior to the VIDA, therefore it is now prohibited to paint with TBT or Cybutryne. However, due to the long history of using these paint coatings, many vessel hulls have layers upon layers of these chemicals and therefore simply need to ensure if the paint chips and comes off they remove it and keep the paint chipping to a minimum if at all possible.

**Q8.)** On the picture in our USCG IQP slides for ID2050, the fluid flowing from the side of the ship, what discharge would you say that is?

A8.) The discharge from the side of the ship is ballast water. It is one of the discharges you do not have to worry about because the job aid for ballast water has already been done.

**Q9.)** If the EPA adds a regulation to VIDA that is impossible for inspectors to realistically check for, would they ignore/skip over it?

A9.) Yes, some things are up to the inspector's discretion on what is or is not important, they have to pick and choose.

*Note: The names and divisions mentioned in the interview have been omitted in order to maintain anonymity in compliance with WPI IRB policy*

*United States Coast Guard*



**Vessel Incidental Discharge Act  
Job Aids**



## **Purpose**

The purpose of these environmental examinations is to enforce vessel compliance with VIDA, and is to reduce the amount of oil, plastics, and other hazardous materials from being discharged into our oceans and port waters. This takes into consideration public safety and the safety of the oceans and marine ecosystems.

### **Vessel Incidental Discharge Act (VIDA) - USCG Job Aids**

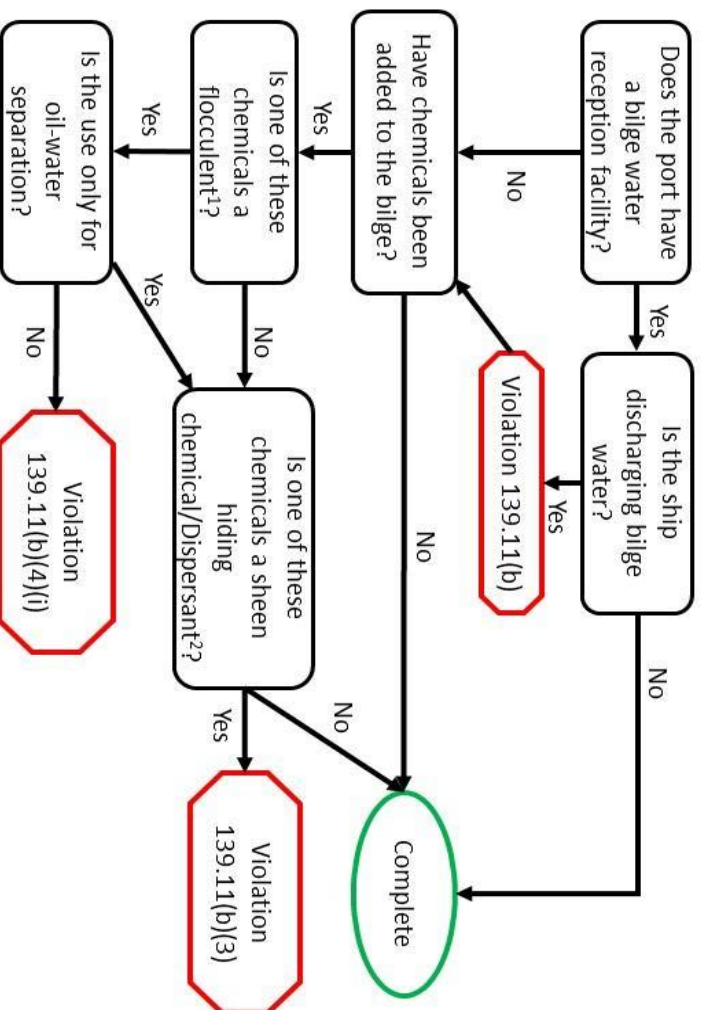
This enclosure is intended to be used as a Job Aid by Coast Guard Marine Inspectors (MI) and Port State Control (PSC) Officers during inspections of U.S. flag vessels and during PSC examinations to assist in verifying that a vessel is in compliance with the December 2018 VIDA. This Job Aid contains a series of subsequent smaller job aids pertaining to checking specific systems and discharges. The depth and scope of the examination must be determined by the MI and PSC Officers based on the condition of the vessel, operation of its systems, and the competency of the vessel's crew. The VIDA delegates responsibility to the Coast Guard for the enforcement of regulations pertaining to vessel discharges during port state control examinations. This Job Aid addresses discharges currently not covered by Coast Guard vessel inspection regulations or policy. Coast Guard personnel will perform these checks in addition to the current safety and security checks. All deficiencies, even if corrected while onboard, shall be documented within MISLE.

| <b>Discharge/System</b>                                                                                                           | <b>VIDA Reference</b> | <b>Page #</b> | <b>Compliant</b> | <b>Not Compliant</b> | <b>Notes/Comments</b> |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|------------------|----------------------|-----------------------|
| Bilges/Bilge Water                                                                                                                | 139.11                | 5             |                  |                      |                       |
| Biofouling                                                                                                                        | 139.6                 | 7 - 8         |                  |                      |                       |
| Boilers/Economizers                                                                                                               | 139.12                | 14            |                  |                      |                       |
| Cathodic Protection                                                                                                               | 139.13                | 7-8           |                  |                      |                       |
| Chain Locker Effluent                                                                                                             | 139.14                | 11            |                  |                      |                       |
| Decks                                                                                                                             | 139.15                | 9             |                  |                      |                       |
| Desalination Systems                                                                                                              | 139.16                | 14            |                  |                      |                       |
| Elevator Pit Effluent                                                                                                             | 139.17                | 16            |                  |                      |                       |
| Exhaust Gas Cleaning System (ECGS)                                                                                                | 139.18                | 10            |                  |                      |                       |
| Fire Protection Equipment                                                                                                         | 139.19                | 11            |                  |                      |                       |
| Gas Turbines                                                                                                                      | 139.20                | 14            |                  |                      |                       |
| Graywater Systems                                                                                                                 | 139.21                | 12            |                  |                      |                       |
| Hulls and Associated Niche Areas                                                                                                  | 139.22                | 7-8           |                  |                      |                       |
| Inert Gas Scrubber Systems                                                                                                        | 139.23                | 16            |                  |                      |                       |
| Motor Gasoline                                                                                                                    | 139.24                | 16            |                  |                      |                       |
| Non-Oily Machinery Wastewater                                                                                                     | 139.25                | 16            |                  |                      |                       |
| Oil + Fuel – Oil-Sea Interfaces and EAL's                                                                                         | 139.7                 | 13            |                  |                      |                       |
| Oily Water Separator                                                                                                              | 139.11                | 6             |                  |                      |                       |
| Pools and Spas                                                                                                                    | 139.26                | 15            |                  |                      |                       |
| Refrigeration and Air Conditioning                                                                                                | 139.27                | 16            |                  |                      |                       |
| Seawater Piping                                                                                                                   | 139.28                | 8             |                  |                      |                       |
| Sonar Domes                                                                                                                       | 139.29                | 16            |                  |                      |                       |
| Any violations should be entered in MISLE under "Activity History" and also "Special Notes" for the next examiner to be notified. |                       |               |                  |                      |                       |

| Records Checklist         |                                                             |                                                                                                             |                                                                      |                                       |
|---------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------|
| Bilges                    | Have any chemicals been added to the bilge?                 | Yes: Name - _____<br>Primary Composition - _____                                                            |                                                                      |                                       |
|                           |                                                             | No: Continue to OWS.                                                                                        |                                                                      |                                       |
| Oily-Water Separator      | Does the Oil Log Book contain any entries exceeding 15 PPM? | Yes: Dates - _____<br>Times - _____                                                                         |                                                                      |                                       |
|                           |                                                             | No: Continue to Biofouling Management.                                                                      |                                                                      |                                       |
| Biofouling Management     | Reference pg. 6-7 of VIDA Job Aid                           | Determine whether all required aspects of the Biofouling Plan and Records were provided. Continue to Decks. |                                                                      |                                       |
| Decks                     | Have any cleaning agents been used on the decks?            | Yes: Name - _____<br>Certification - _____                                                                  |                                                                      |                                       |
|                           |                                                             | No: Continue to Fire Protection.                                                                            |                                                                      |                                       |
| Fire Protection Equipment | Has the vessel discharged AFFF or fire suppression foam?    | Yes: Date - _____<br>Location - _____                                                                       | Has the vessel discharged their fire main within 12nmi of US shores? | Yes: Location - _____                 |
|                           |                                                             | No: ----->                                                                                                  |                                                                      | No: Continue to Oil and Fuel.         |
| Oil and Fuel              | List lubricants used for Oil to Sea interfaces:<br>_____    | Corresponding EAL certifications or documentation:<br>_____                                                 |                                                                      |                                       |
| Boilers/Economizers       | Has any non-routine blowdown been performed and discharged? | Yes: Date - _____<br>Location - _____                                                                       | Has any hydrostatic test water been discharged?                      | Yes: Date - _____<br>Location - _____ |
|                           |                                                             | No: ----->                                                                                                  |                                                                      | No: Continue to Inspection            |

## Bilges Inspection Job Aid

To prevent harmful chemicals from damaging aquatic and marine environments and dependent species.



<sup>1</sup>Flocculent: A substance which promotes the clumping of particles

Organic Flocculent List: Polyammine and PolyDADMAC, Melamine Formaldehydes and Tannins

Inorganic Flocculent List: Aluminum Sulfate, Aluminum Chloride, PACl & ACH, Ferric & Ferrous Sulfate, Ferric Chloride

<sup>2</sup>Sheen Hiding Chemical/Dispersant: Any substance that disperses or breaks up oil particles, having the effect of eliminating the reflective and colorful finish on water surfaces.

Examples of Sheen Hiding Chemicals/Dispersants (Including but not Limited to): Dish Soap, COREXIT EC9500A/B, JD 109, JD 2000

## Biofouling Management Job Aid

To reduce the introduction of invasive species which can outcompete and eliminate native species, irrevocably altering ecosystems.

Vessel MUST provide a full Record of Biofouling Management Practices upon request. Records must include/consider each of the elements listed in the table below, as directed by USCG Implementation<sup>1</sup>.

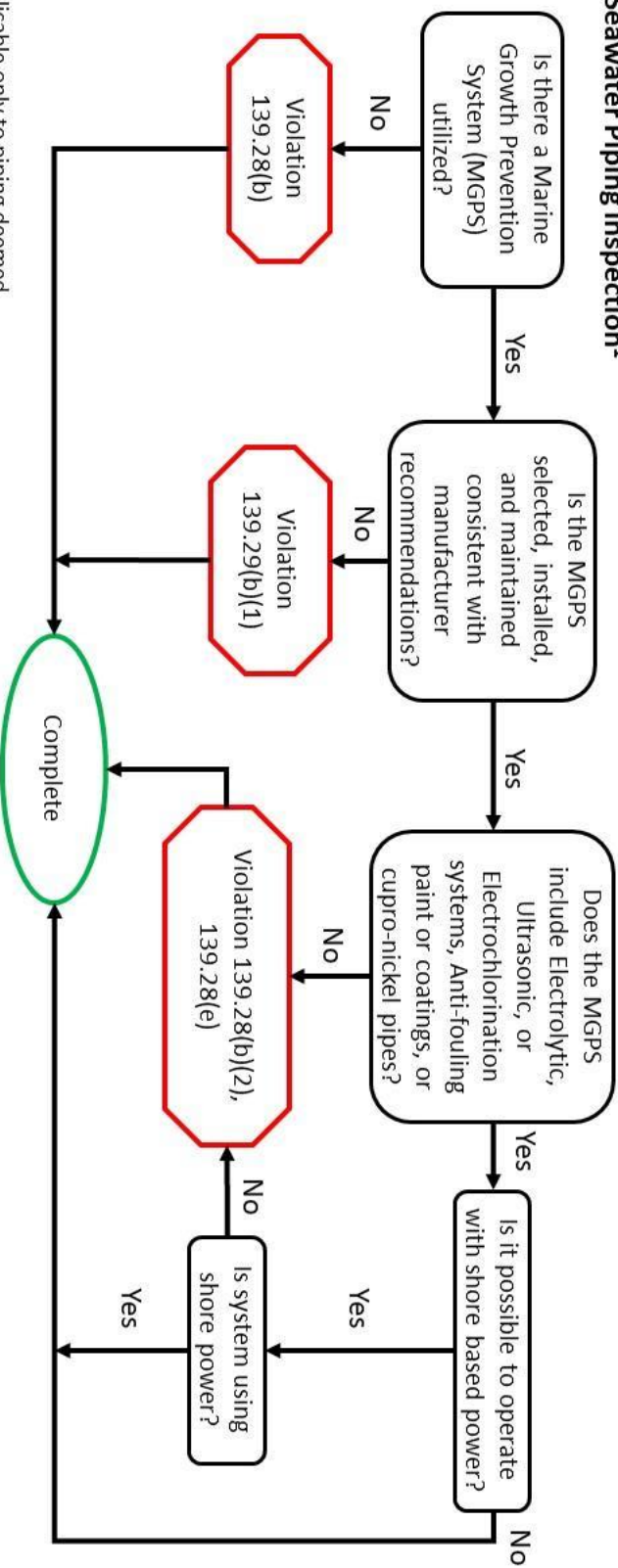
| Requirement                                           | Info                                                                                                                             | Included | Missing | Examiner Notes |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------|---------|----------------|
| Vessel Operating Profile                              |                                                                                                                                  |          |         |                |
| Anti-Fouling System Details and Operational Practices | Installation Date and Location, Coating Areas, System Maintenance, Operation, and Recommendations, Supplies/Chemicals Used       |          |         |                |
| Areas Susceptible to Biofouling                       | Including Niche Areas, Cathodic Protection                                                                                       |          |         |                |
| Schedule/Plan for Inspections/Maintenance/Renewal     | Including Dry Dock and Cleaning, Biofouling Removal Measures, Any Systems Repairs or Renewal                                     |          |         |                |
| Waste Disposal Procedures                             | Biological Waste from System, Dates and Location                                                                                 |          |         |                |
| Process for Recordkeeping of Operation/Maintenance    | Records of Anti-Fouling Systems and Internal Seawater Cooling Systems: Dates and Location, Results, Any Corrective Actions Taken |          |         |                |
| Contingency Measures for System Failure               | e.g. Freshwater Flushing, Chemical Dosing                                                                                        |          |         |                |

<sup>1</sup>Implementation plan TBD. Requirements listed are temporary placeholders derived from MEPC 207.62 as directed by IMO.

# Biofouling Management Job Aid Continued

To reduce the introduction of invasive species which can outcompete and eliminate native species, irrevocably altering ecosystems.

## Seawater Piping Inspection<sup>1</sup>

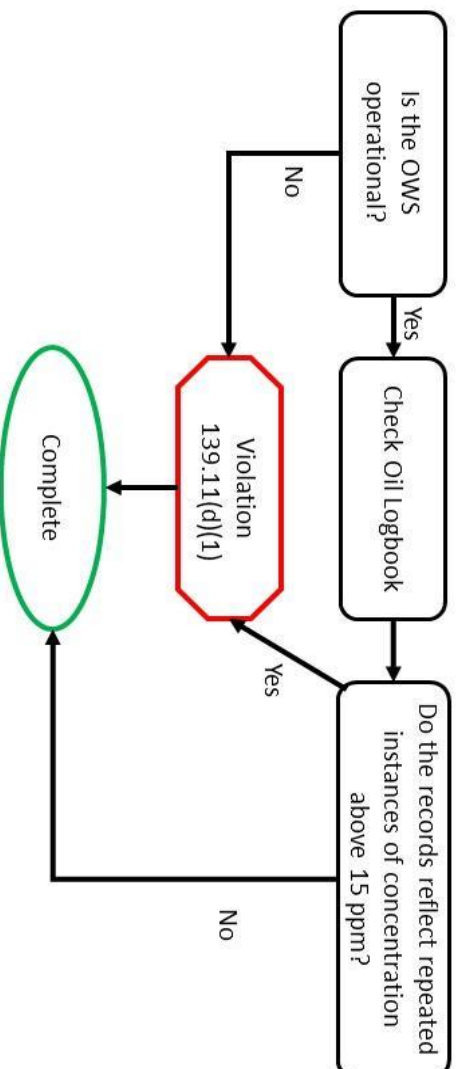


<sup>1</sup>Applicable only to piping deemed susceptible to Macrofouling<sup>2</sup> in management plan

<sup>2</sup>Macrofouling: A Fouling Rating greater than 20 (Section 139.6(b))

## Oily-Water Separation (OWS) Inspection Job Aid

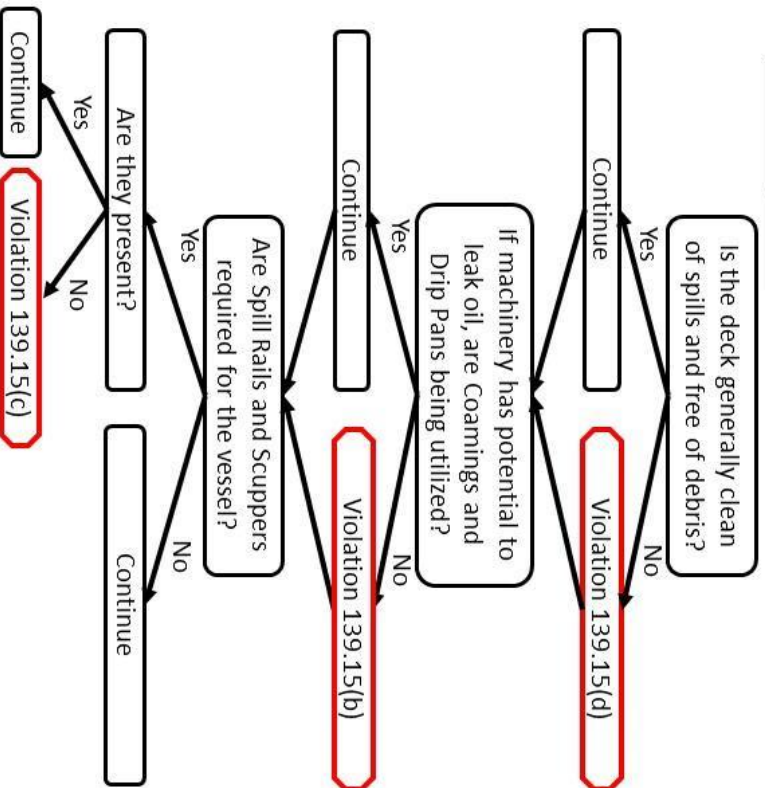
To prevent harmful chemicals from damaging aquatic and marine environments and dependent species.



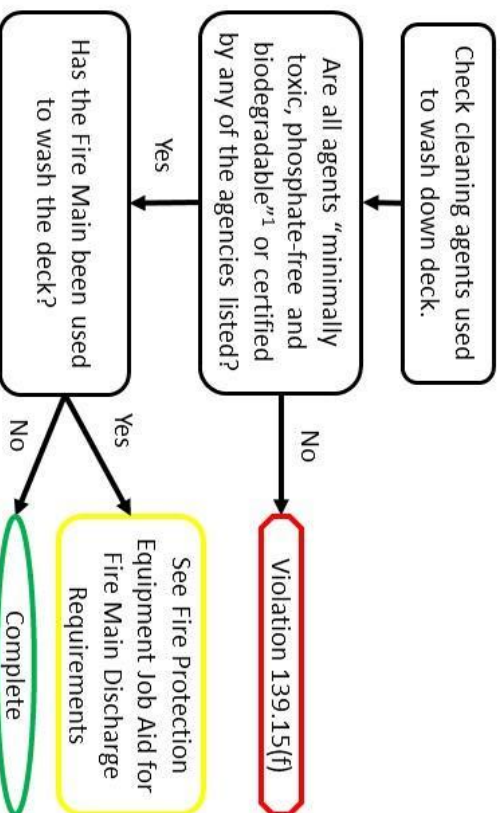
## Decks Inspection Job Aid

To prevent waste from damaging the aquatic and marine environments and dependent species.

### Visual Inspection



### Records Checks



#### Certified Agent Examples:

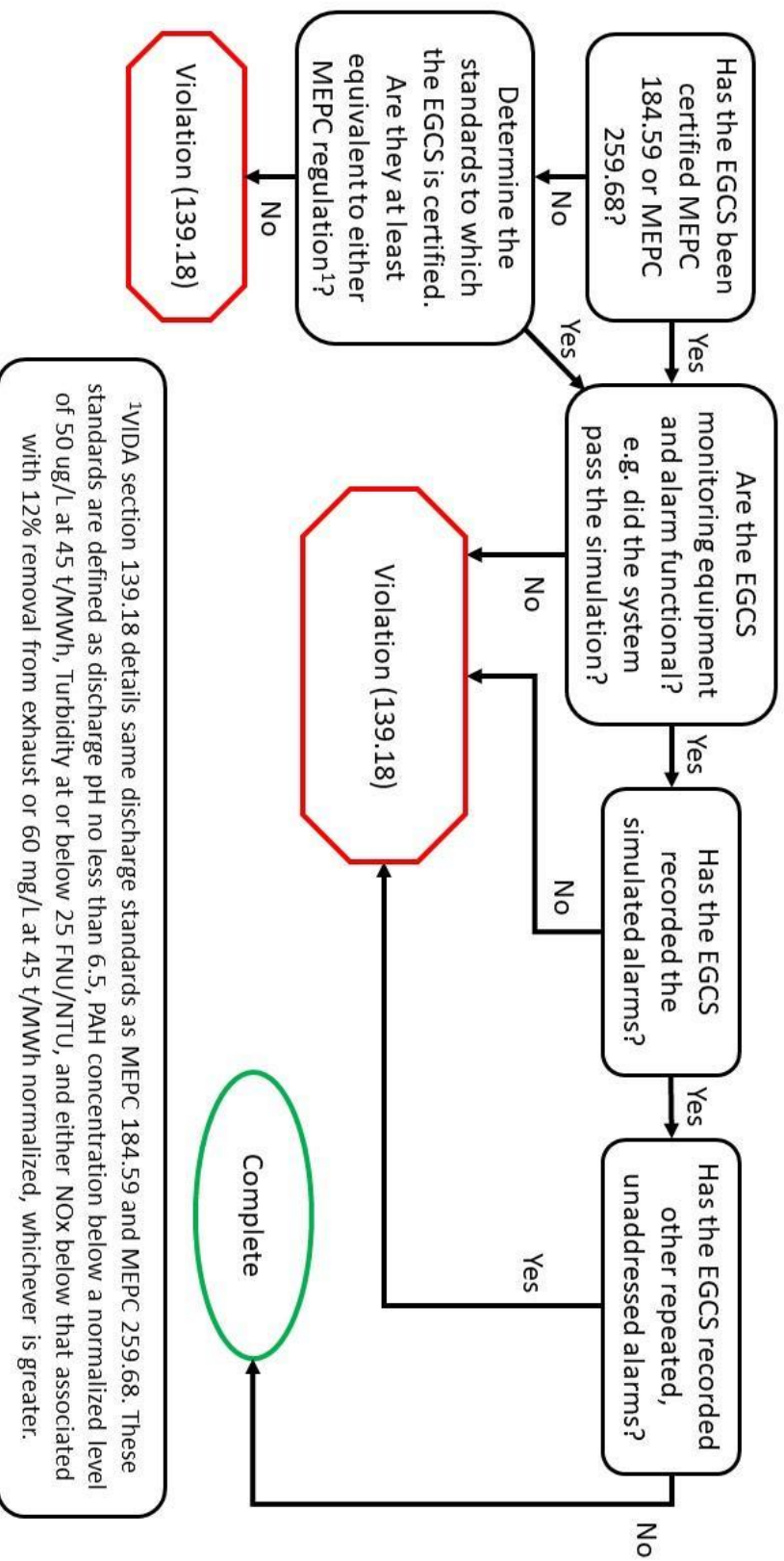
EPA Safer Choice, Green Seal, ISO 14024, Eco Leaf, Nordic Swan, or Cradle-to-Cradle

<sup>1</sup>CG-CVC can be contacted for technical assistance at [CGCVC@uscg.mil](mailto:CGCVC@uscg.mil).



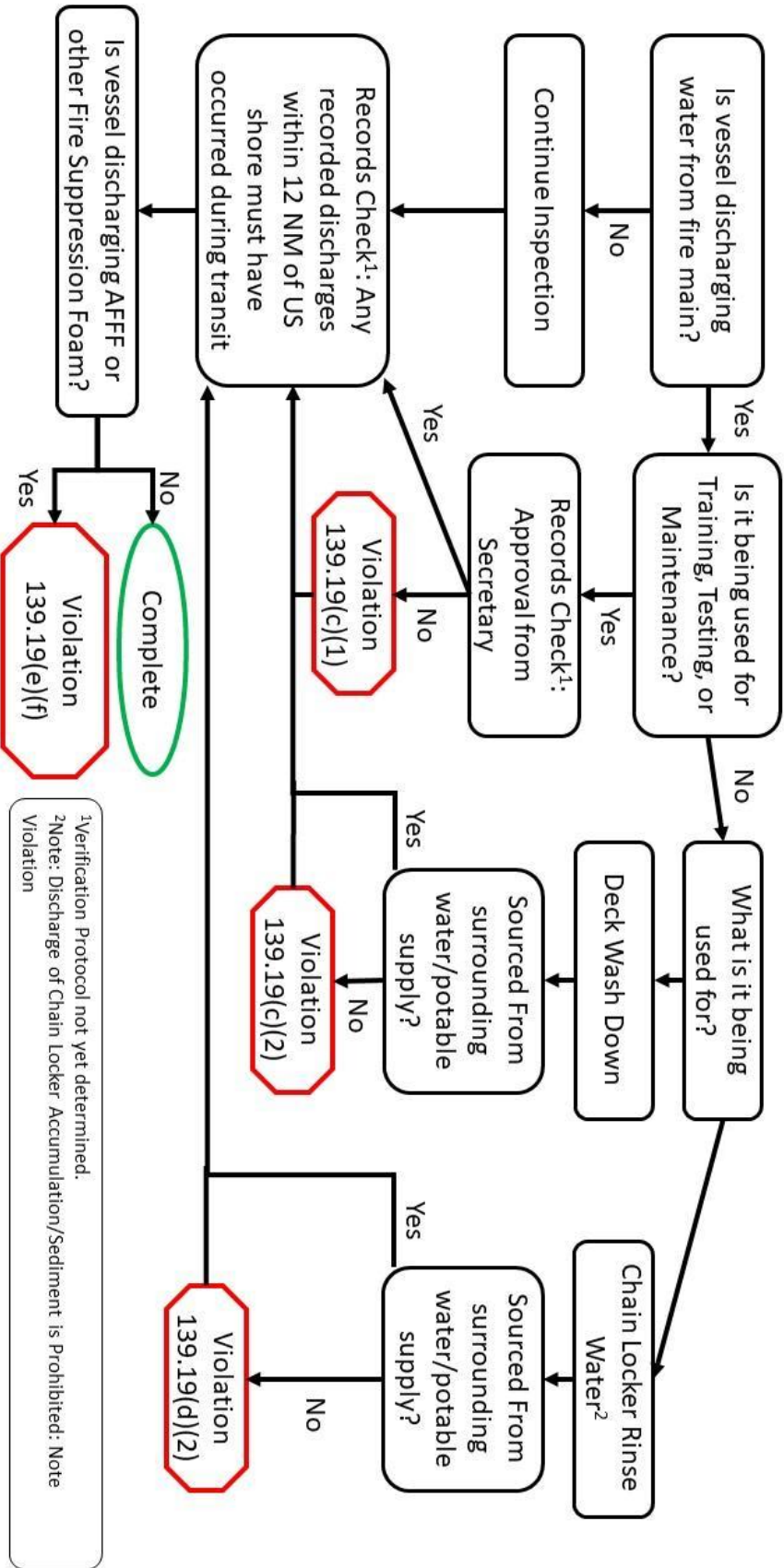
## Exhaust Gas Cleaning System Job Aid

To prevent harmful chemicals from damaging aquatic and marine environments and dependent species.



## Fire Protection Equipment Inspection Job Aid

To prevent harmful chemicals in fire dispersants or leached from sea-water piping from damaging aquatic and marine environments and dependent species.

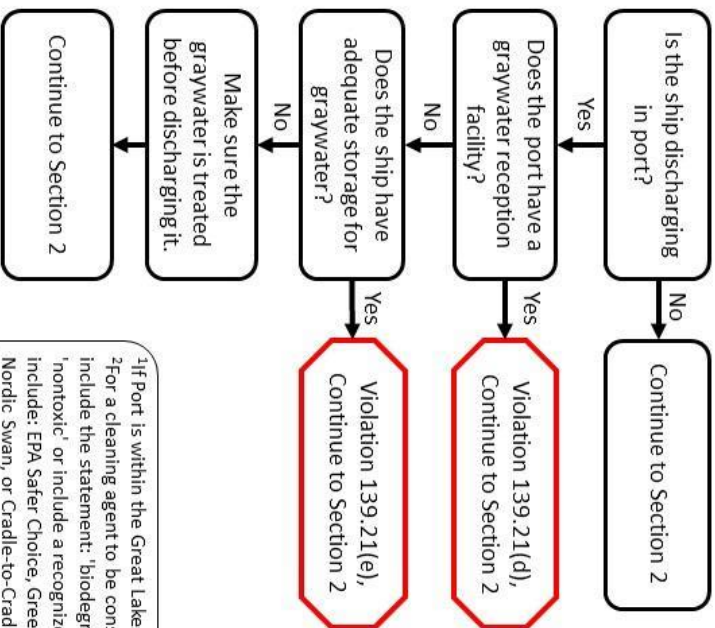


<sup>1</sup>Verification Protocol not yet determined.  
<sup>2</sup>Note: Discharge of Chain Locker Accumulation/Sediment is Prohibited: Note Violation

# Graywater Inspection Job Aid

To prevent harmful chemicals and micro-plastics from damaging aquatic and marine environments and dependent species.

## Section 1-Discharge Check



## Section 2-Records Check

| Ship Weight               |                                                      |              |           |
|---------------------------|------------------------------------------------------|--------------|-----------|
| Ship Age                  |                                                      |              |           |
| Human Capacity of Ship    |                                                      |              |           |
| Current Port <sup>1</sup> |                                                      |              |           |
| Discharges                | Limits                                               | Actual Value | Pass/Fail |
| Fecal Coliform            | 30-Day: 20 cfu/100 mL, 90% of Samples: 40 cfu/100 mL |              |           |
| BOD5                      | 30-Day: 30 mg/L, 7-Day: 45 mg/L                      |              |           |
| Suspended Solids          | 30-Day: 30 mg/L, 7-Day: 45 mg/L                      |              |           |
| pH                        | Lower: 6.0, Upper: 9.0                               |              |           |
| Residual Chlorine         | Total: 10 µg/L                                       |              |           |

List of Cleaning Supplies: \_\_\_\_\_

Are these cleaning supplies considered minimally toxic, phosphate free, and biodegradable?<sup>2</sup>

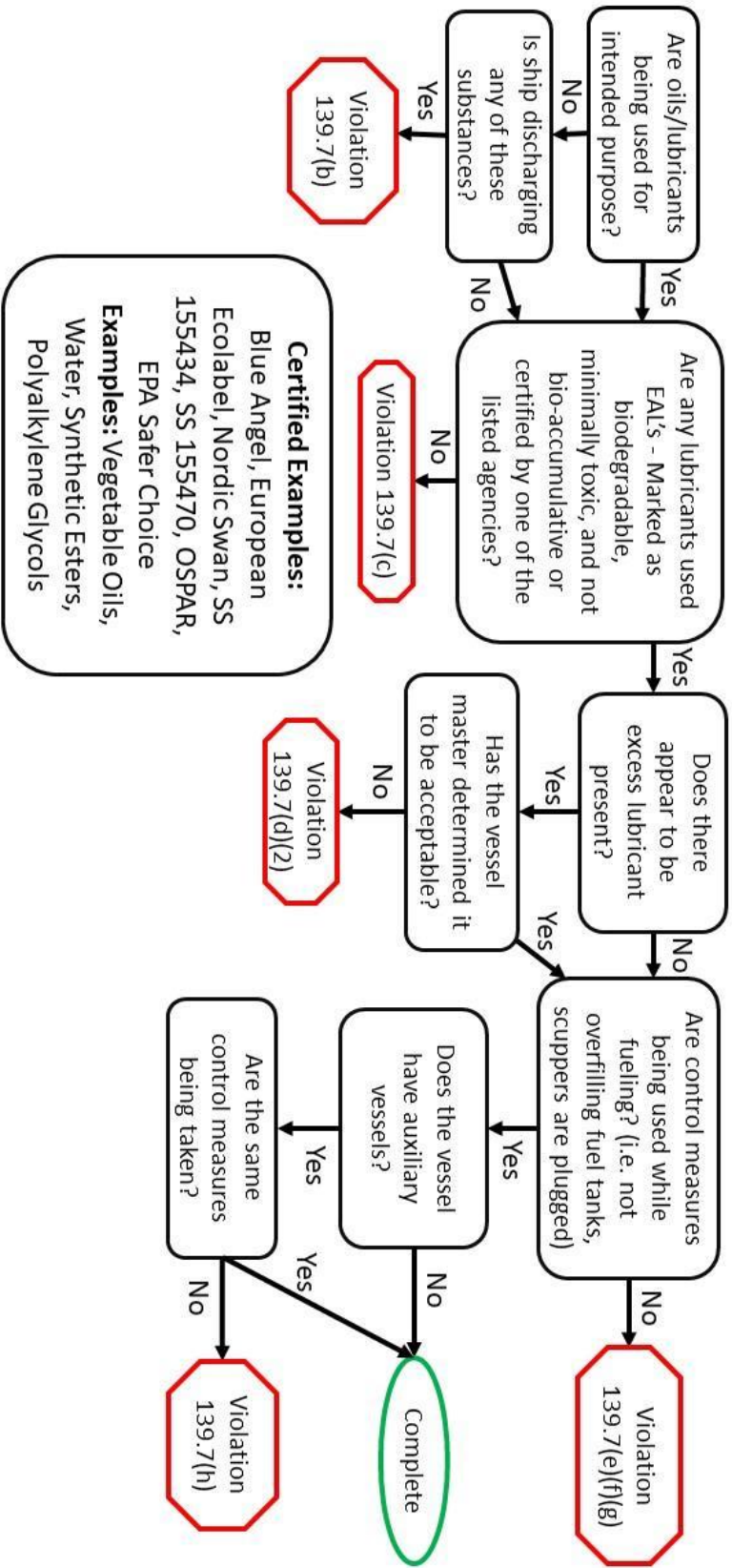
Yes (Pass)  No (Violation)

<sup>1</sup>If Port is within the Great Lakes, see Section 140.3d in 10 CFR.  
<sup>2</sup>For a cleaning agent to be considered this, the label must include the statement: 'biodegradable', 'phosphate-free' and 'nontoxic' or include a recognized equivalent certification<sup>2</sup> to include: EPA Safer Choice, Green Seal, ISO 14024, Eco Leaf, Nordic Swan, or Cradle-to-Cradle. CG-CVC can be contacted for technical assistance at CGCVC@uscg.mil.

# Oil and Fuel

To prevent harmful oils, fuels, and lubricants from being released into the aquatic environment.

Applies to Oil-Sea Interfaces and Fueling Operations



**To prevent hazardous chemicals that have leached from metal machinery or accumulated within machinery over time from damaging aquatic and marine environments and dependent species.**

|                             |                                                                                                                                   |     |                     |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----|---------------------|
| <b>Desalination Systems</b> | Are desalination brine, reject water, or similar residuals being discharged in port?                                              | Yes | Violation 139.16(b) |
|                             |                                                                                                                                   | No  | Continue            |
|                             | Are other effluents related to the routine cleaning of desalination systems being discharges other than the ones specified above? | Yes | Violation 139.16(c) |
|                             |                                                                                                                                   | No  | Complete            |

|                            |                                                                                                     |     |                     |
|----------------------------|-----------------------------------------------------------------------------------------------------|-----|---------------------|
| <b>Boilers/Economizers</b> | Are there records that any boiler or economizer has undergone maintenance resulting in a discharge? | Yes | Continue            |
|                            |                                                                                                     | No  | Complete            |
|                            | Do onboard records indicate that this effluent has been retained and not discharged?                | Yes | Continue            |
|                            |                                                                                                     | No  | Violation 139.12(b) |
|                            | Is water from hydrostatic testing being discharged?                                                 | Yes | Violation 139.12(c) |
|                            |                                                                                                     | No  | Complete            |

|                     |                                                                                                                                                                                     |     |                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------|
| <b>Gas Turbines</b> | Is the gas turbine discharge treated?                                                                                                                                               | No  | Violation 139.20(b)                               |
|                     |                                                                                                                                                                                     | Yes | Follow regulations for bilge (See bilges job aid) |
| <b>Pools/Spas</b>   | Is the discharge in port unintentional (i.e. rain, storm, wind, rough waters)                                                                                                       | No  | Violation 139.26(b)                               |
|                     |                                                                                                                                                                                     | Yes | Continue                                          |
|                     | Check records to see if the discharge of pool and spa water underway matches the following requirements:<br>Total residual chlorine < 100 µg/L<br>Total residual oxidants < 25 µg/L | No  | Violation 139.26(b)(2)(i)(ii)                     |
|                     |                                                                                                                                                                                     | Yes | Complete                                          |

|                                                                                                |                                           |                                                                                                                                          |
|------------------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Discharge of these effluents are always prohibited.</b>                                     | Elevator Pits                             | Discharge of untreated accumulated water and sediment from any elevator pit                                                              |
|                                                                                                | Non-Oily Machinery                        | Untreated wastewater and packing gland, stuffing box effluent containing toxic or bio accumulative additives, oils in harmful quantities |
|                                                                                                | Refrigeration and Air Conditioning        | Direct overboard discharge of any condensate that contacts toxic or hazardous materials                                                  |
|                                                                                                | Sonar Domes                               | Discharge of water from inside a sonar dome                                                                                              |
| <b>For these discharges, refer to General Discharge Regulations in Subpart B Section 139.5</b> | Inert Gas Scrubber System                 |                                                                                                                                          |
|                                                                                                | Motor Gasoline and Compensating Discharge |                                                                                                                                          |

**Note:** These job aids were created using draft regulations, may be subject to change after USCG regulations are published in 2022.

**Note:** Self-monitoring of vessels by crew may vary as protocols for self-monitoring and record keeping are not yet defined by the United States Coast Guard. Therefore, any reference to records checks, analytical testing or inspection protocols are temporary and may be subject to change.