

ON-DEMAND, 3RD PARTY

Ballast Water Treatment as a Service



The Challenge

A large offshore maritime service provider purchased multiple Offshore Support Vessels (OSVs). The OSVs were wet towed to the U.S. When the vessels arrived at a U.S. shipyard for repairs and Special Surveys, the customer realized the residual ballast water (estimated at 3,500 m³) would need to be compliant with United States Coast Guard (USCG) regulations before being discharged. The client was facing very expensive disposal fees for the unmanaged ballast water disposal at the shipyard. However, compliance with the USCG regulations and U.S. Environmental Protection Agency (EPA) Vessel General Permit (VGP), ballast water sourced from outside the same USCG Captain of the Port (COTP) Zone must be treated to reduce living biological organisms to reduce potential aquatic invasive species

(AIS) transfer before the water can be discharged. These vessels do not have on-board Ballast Water Treatment Systems (BWTS), therefore the customer was left with a difficult and expensive challenge to solve. The best option would be to use a third-party ballast water reception (BWR and treatment provider. This type of BWR service is not generally available but is now commercially available. The customer learned that **Freedom Ballast** has an entire business model built around providing BWR treatment. **Freedom Ballast** is in the process of deploying a full scale barge based BWR treatment service, but this project is still in its early stages. **Freedom Ballast**, however, did have a mobile, containerized, BWTS that could be mobilized to support this customer and their needs.



CASE STUDY

Background of Ballast Water Convention and Regulations

Globally, ballast water treatment and discharge requirements are defined under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, an International Maritime Organization (IMO) treaty established in 2004 and ratified in 2016 that requires signatory member States to ensure that ships flying the flag of the signatory States are compliant.

In the U.S., ballast water management is enforced by USCG and the EPA. The USCG regulations (contained in 33 CFR 151 Subparts C & D) and the requirements in the EPA's 2013 VGP, ballast water management and discharge reporting is significantly different from the IMO's Convention requirements. The U.S. regulations and requirements, already in force, have resulted in numerous fines ranging from unauthorized discharges to improper procedures. Ships have been cited and fined for discharging improperly exchanged ballast water, discharging improperly managed (i.e., improperly treated) ballast water, and improper record keeping and reporting. USCG Port State Control (PSC) efforts are ramping up post-COVID-19 and we expect to see more findings and fines on the maritime industry for improper ballast water management.

The ballast water management performance and discharge standards demand near perfect compliance from the maritime industry. The technologies, maintenance, repair, and calibrations of the BWTS are

not enough to meet the demands with operator training often the weakest link. Meeting the minimum compliance requirements (i.e., installed type approved BWTS, ballast water management plan, and ballast water record keeping) is proving insufficient to protect the shipowners and operators from non-compliance. While many vessel owners and operators may choose to install an on-board BWTS, it is evident, based on published reports, that 30-50% of these systems fall into disrepair and non-compliance that can cause delays and interruptions in the vessel schedule that are costly for the involved parties and will cascade costly effects throughout the related supply chains. To enable the vessel to stay in service, an independent 3rd party operating a BWR facility can treat ballast water as a service providing compliance with the regulations. **Freedom Ballast** was formed specifically to provide ballast water reception and treatment as a service using barge based and port side ballast water reception facilities. **Freedom Ballast** is developing BWR facilities for ports on the Mississippi River, Houston Ship Channel, and New York harbor for New York and New Jersey ports. Currently, **Freedom Ballast** has a mobile containerized BWTS that can be utilized for de-ballasting and treatment services.

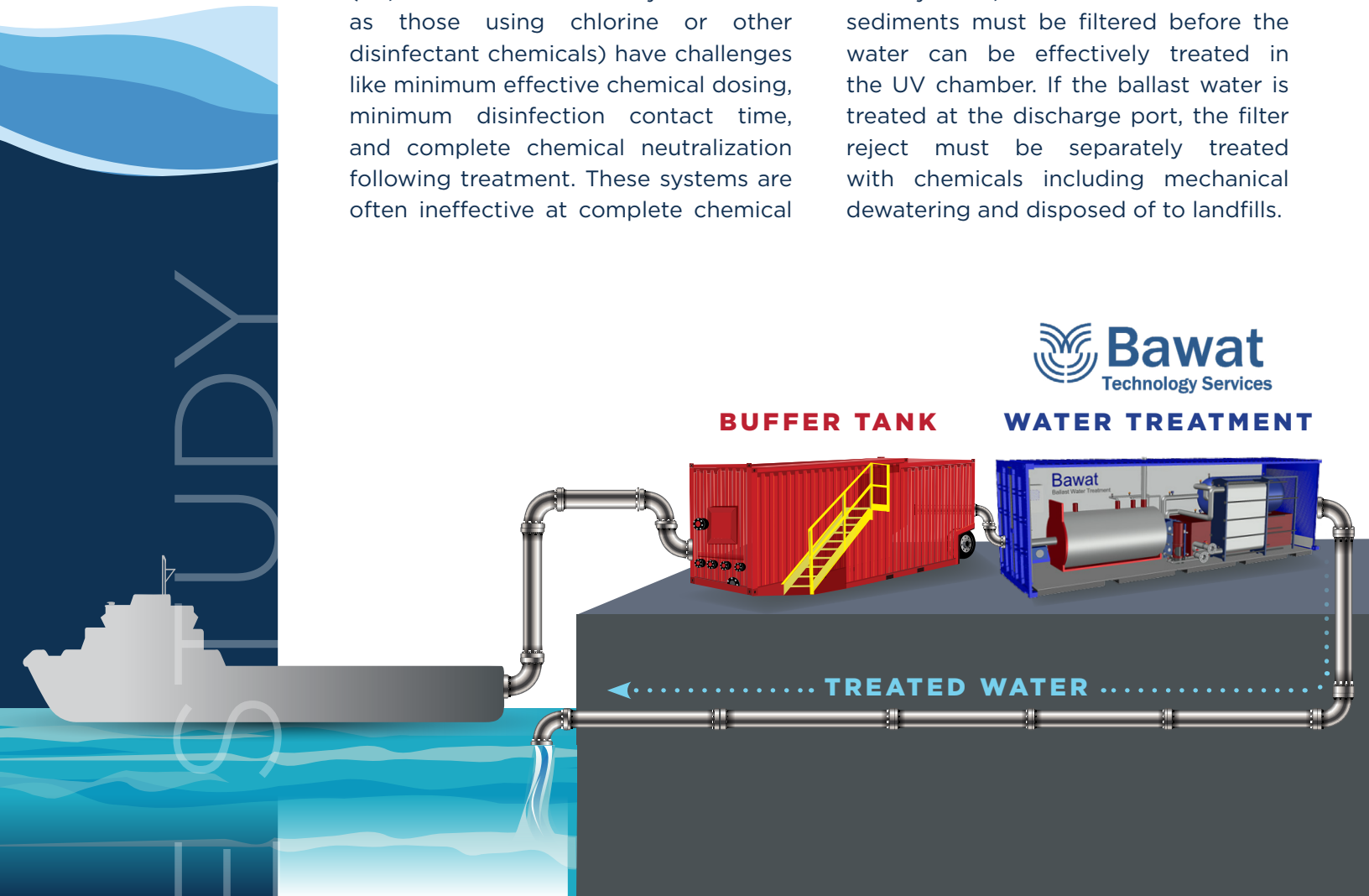
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The **Freedom Ballast** Solution

Ballast water can and often does contain high levels of sediment. This increases the turbidity of the water that makes it difficult for effective disinfection using an ultraviolet radiation (UV) based BWTS. Active substance based BWTS (i.e., chemical treatment systems such as those using chlorine or other disinfectant chemicals) have challenges like minimum effective chemical dosing, minimum disinfection contact time, and complete chemical neutralization following treatment. These systems are often ineffective at complete chemical

neutralization during discharge causing non-compliance problems. Additionally, the use of these technologies can cause damage to the receiving waters from acute and chronic disinfection byproducts (DBP) concentrations. For UV systems, entrained debris and sediments must be filtered before the water can be effectively treated in the UV chamber. If the ballast water is treated at the discharge port, the filter reject must be separately treated with chemicals including mechanical dewatering and disposed of to landfills.



The **Freedom Ballast** solution is based on the Patented Bawat Pasteurization process, where the water, including the sediments, is heated to 64 °C (minimum) with a 40 second hold time and then discharged. This process provides a simple one-pass solution that requires no additional treatment. **Freedom Ballast**

has a Patent pending process that combines UV systems with the Pasteurization system to deliver a lower cost, reduced energy demand, high throughput solution for effective ballast water treatment compliance.



The BWR project execution

The mobile containerized BWTS was set on the deck of the OSV to provide treatment compliant with USCG regulations and EPA requirements. The OSVs, with low ballast water discharge capacities and numerous small volume ballast tanks, were unable to continuously pump ballast water to the portable BWR facility. A temporary buffer tank (providing a surge volume) was used to allow continuous feed to the BWR facility. Cross connecting the OSV ballast and cargo systems allowed the ballast water to be discharged

through topside piping risers. Flexible hoses were used to connect the OSV discharge headers to the buffer tank. The buffer tank was then connected to the portable BWTS. During ballast discharge and treatment, the effluent biological organisms monitoring samples required by the U.S. EPA VGP were collected and analyzed by a local water quality analysis laboratory. When the OSV ballast tanks were empty, BWR operations were completed by treating the ballast water in the buffer tank.



Results and Conclusion

When the customer received the OSVs and had arrived at the U.S. shipyard, the ballast water was subject to USCG regulations and U.S. EPA requirements. Faced with limited and costly discharge options, the customer reached out to **Freedom Ballast** for help with treatment and compliance for this ballast water. The **Freedom Ballast** portable containerized BWTS was successfully used to receive, treat, and discharge ballast water from the OSVs meeting all USCG regulations and U.S. EPA requirements.

Portable BWR facilities for U.S. ballast water discharge regulations provide a cost effective and reliable alternative to shipboard installed BWTS. USCG regulations require costly upgrades or replacement of older BWTS that were installed under the USCG's limited

duration Alternate Management System (AMS) accepted program. Additionally, when vessels arrive at U.S. ports and are unable to operate a shipboard BWTS to complete treatment (or re-treatment) in accordance with the BWTS USCG type approval certificate, the owners now have reliable and effective BWR options provided by **Freedom Ballast**.

Within the next 12-18 months, **Freedom Ballast** aims to deploy multiple barge based and post side BWR facilities for the treatment and discharge of ballast water compliant with all regulations. In the meantime, **Freedom Ballast** is available to provide limited treatment with the mobile containerized BWTS.

For more information, contact
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