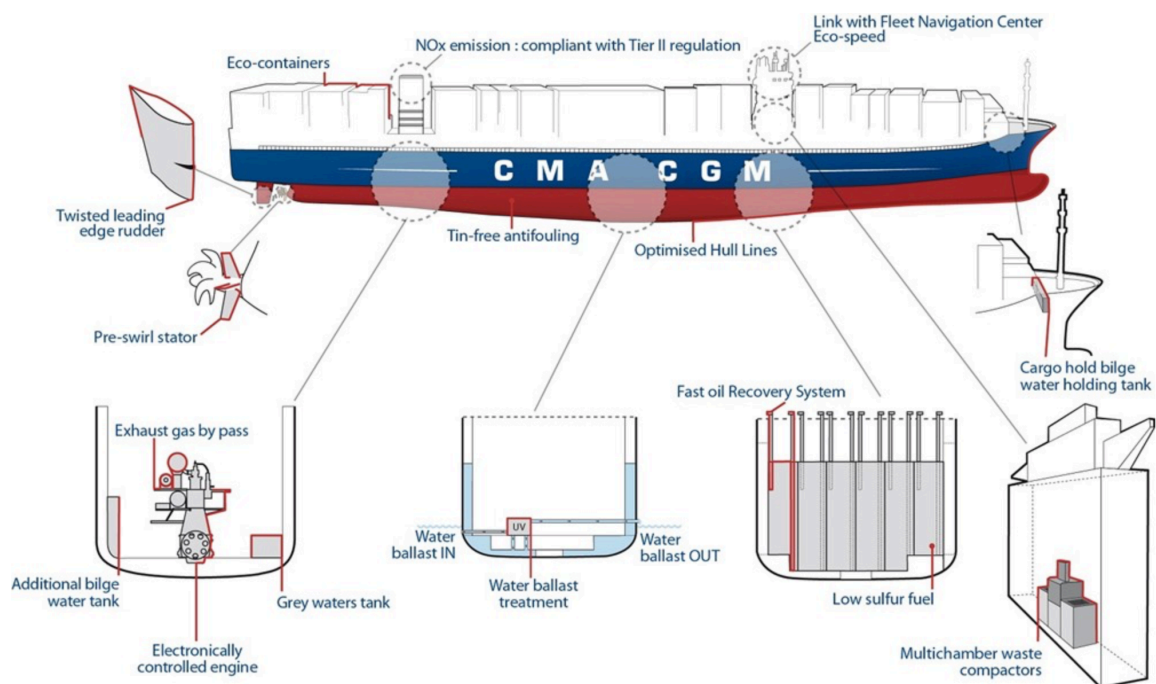




P.O. Box 515429  
 Dallas, Texas 75251  
 Ph: (972) 669-3390  
 Fax: (469)241-0896  
 Email: oseicorp@msn.com  
 Web: www.osei.us

## OSEI Vessel Fuel Tank Clean Up

**I. Problem:** IMO is requiring the clean up of all fuel tanks, to convert over to low sulphur fuels, or requiring the expensive addition of filters, and scrubbers.



**II. Parameters:** When fuel holding tanks are drained down there will be a certain amount of sludge and unusable fuel oil, that will be required to be removed, as well as the removal of residual fuel oil from the walls of the fuel oil container.

There is also a secondary fuel oil settling tank that will require clean up and removal of heating oil as well, including the plumbing lines between the holding tank and the settling tank.



**III. Calculations for bottom sludge waste fuel oil:** A long tube or stick will need to be placed into a tank, (measuring process is the same for all tanks) and pushed to the bottom of the tank. Then pull the tube or stick out and see where the oil mark is highest on the tube or stick. This will be your depth of sludge or unusable fuel oil. The size of the tank, will be known by the personnel that handle fueling, in order for you to get the length and the width of the tank.

This will give you the total area in cubic meters, which you merely convert to liters. Example if you have 1 cubic meters X 1000 equals 1,000 liters.

**A. Calculations** For English standard would be to take the length X width X depth to give you cubic feet. You multiply cubic feet by 7.48, and this will give you the gallons of contaminant

**B. Metric:** To determine the amount of OSE II utilized, you take 1,000 liters divided by 50 (or 50 liters of water mixed with 1 liter of OSE II) will address 50 liters of contaminant, therefore you take 1000 divided by 50 and you get 20 liters of OSE II required.

**20 liters** of OSE II will require mixing with 1000 liters, will then be applied to the 1000 liters of contaminant

**C. English Standard:** To determine the amount of OSE II utilized, For Example 264 gallons divided by 50 (50 gallons of water mixed with 1 gallon of OSE II) will address 50 gallons of contaminant, therefore you take 264 divided by 50 and you get 5.28 gallons or 5 gallons and 36 ounces of OSE II required.

**5.28 gallons** of OSE II will require mixing with 264 liters, will then be applied to the 264 liters of contaminant.

#### **Calculations for the surface/walls of the fuel tank:**

**D. Metric:** Clean Tank walls/surface by applying 1 Liters of OSE II-water mixture per 2.43 square meters of surface.

10 Liters of OSE II and water can be used to clean 24.3 square meters, or 1 drum 208 liters of OSE II and water mixture per 505.44 square meters

**E. English Standard:** Clean Tank walls/surface by applying 1 gallon of OSE II-water mixture per 100 square feet of surface

10 gallons of OSE II can be used to clean 1000 square feet, or 1 drum 55 gallon drum and water mixture of OSE II per 5500 square feet.

#### **IV. Water Requirements:**

Once the volume of contaminant contained in the bottom of the fuel tank is determined, you will divide this volume by 2, and that will be the amount of water that is added to the fuel tank before applying OSE II water mixture. The application of this water can be from whatever source is outside of the vessel, whether it is ocean water or fresh water. This water will be discharged directly into the fuel tank.



**There are two basic means to handle clean up, in a ships fuel Tanks.**

**V. Eductor/Induction system from the onboard fire fighting system, or from a ships on board water system with a venture, induction, eductor nozzle.**

**A.** Eductor/Induction system from the onboard fire fighting system, or from a ships on board water system with a venture, induction, eductor nozzle, can be used by merely adding the product tube that would be introduced to the foam container, directly into the OSE II container, ( 55 gallon drum/208 liter drum, or one of the 2.5 gallon container/ 9.45 liter containers) set the eductor/induction to 2 %; which produces the 50 to 1 mixing ratio.

**Note:** All hatches to the fuel tanks should be opened, before applying OSE II

**B.** The person applying the OSE II and water mixture would apply to a particular area/point of the spill until the fuel/oil/hydrocarbons started to flow, then move to the next area/point of the spill until it started to flow, and repeat this application until all of the fuel/oil/hydrocarbons started flowing, which means the molecular structure of the fuel/oil/hydrocarbons has been broken down.

**C.** If you have calculated the required of volume for a containerized contaminant, then you can inject the OSE II directly onto the contaminant, constantly moving where the injection of OSE II is applied, eventually swirling the contaminant with OSE II.



**D.** You will need a circulation pump, with a suction hose and a discharge hose to mix the contaminant in the container to help mix the OSE II and contaminant thoroughly.

**E.** You will also want to place an air discharge hose from a compressor into the contaminant, once all the OSE II has been applied, and leave in place until all the effluent has been decanted from the container.

**NOTE:** Confined space entry can be made after about 10 minutes of the finish of the application, of OSE II and water, since OSE II will eliminate the VOCs from emitting from the fuel oil, and the flammability will be eliminated. The aeration will help speed up the actions of the molecular breakdown of the fuel oil.

**Note: If the effluent contaminant is too deep to stand in then, you will need to address the walls once the effluent contaminant is decanted from the tank.**

**F.** The next step will be to apply the required OSE II and water mixture to the surface and walls of the container starting at the top of the container working down the walls until all the surface of the walls have been addressed,



**G.** Once the molecular structure of the fuel/oil/hydrocarbons has been broken down several things have occurred, the adhesion properties of the fuel/oil/hydrocarbons has been eliminated, the toxicity to the environment has been reduced or eliminated, the fuel/oil/hydrocarbons, are caused to lift out of the pours of the

concrete/asphalt/steel surface and float on top of these structures, making it easy to wash the effluent.

**H. Importantly, the flammability** of the fuel/oil/hydrocarbons will have been eliminated as well, so wherever the effluent may flow to or be washed to there will be no flammability problem.

**VI.** While the first actions of OSE II are taking place the multiple enzymes in OSE II will attach themselves readily to the fuel/oil/hydrocarbons, and act as catalyst to speed up the reactions to break down the molecular structure of the fuel/oil/hydrocarbons, as well.

**VII.** On board power washer sprayer system separate from an educator system, or power washer brought on board with storage tank/container to mix OSE II and water, and then used to decant effluent contaminant into. The container should have aeration and circulation pump.

**Note:** A water truck where OSE II is mixed at 2% at the nozzle could be used with a separate truck with a suction hose to extract the effluent/contaminant to hold onshore while the effluent/contaminant remediates to CO<sub>2</sub> and water, generally 21 to 30 days, where the effluent can be discharged as non-potable water.



The truck on the left, extracts or sucks up the effluent contaminant, the truck on the left has OSE II and water mixture to apply to the contaminant fuel/hydrocarbons. You may have to mix OSE II and water in the truck more than one time depending on the amount of contaminant/ fuel/hydrocarbons.



**A.** Gasoline/diesel power sprayer on board or brought on board with a with storage tank/container to mix OSE II and water, and then used to decant effluent contaminant into. The container should have aeration and circulation pump. Pour the required amount of OSE II into the container, then add the required water, you may have to add OSE II and water several times to have enough OSE II and water to address the contaminant in the tank this mixture produces the 50 to 1 mixing ratio, and then you want a 1 to 1 application rate.

**Note:** All hatches to the fuel tanks should be opened, before applying OSE II

**B.** The person applying the OSE II and water mixture would apply to a particular area/point of the spill until the fuel/oil/hydrocarbons started to flow, then move to the next area/point of the spill until it started to flow, and repeat this application until all of the fuel/oil/hydrocarbons started flowing, which means the molecular structure of the fuel/oil/hydrocarbons has been broken down. If the sprayer runs out of the OSE II and water mixture, you may have to refill with OSE II and water multiple times depending on the size of the spill.

**C.** If you have calculated the required of volume for a containerized contaminant, then you can inject the OSE II directly onto the contaminant, constantly moving where the injection of OSE II is applied, eventually swirling the contaminant with OSE II.

**D.** You will need a circulation pump, with a suction hose and a discharge hose to mix the contaminant in the container to help mix the OSE II and contaminant thoroughly.

**E.** You will also want to place an air discharge hose from a compressor into the contaminant, once all the OSE II has been applied, and leave in place until all the effluent has been decanted from the container.

**NOTE:** Confined space entry can be made after about 10 minutes of the finish of the application, of OSE II and water, since OSE II will eliminate the VOCs from emitting from the fuel oil, and the flammability will be eliminated. The aeration will help speed up the actions of the molecular breakdown of the fuel oil.

**Note: If the effluent contaminant is too deep to stand in then, you will need to address the walls once the effluent contaminant is decanted from the tank.**

**F.** The next step will be to apply the required OSE II and water mixture to the surface and walls of the container starting at the top of the container working down the walls until all the surface of the walls have been addressed.



**G.** Once the molecular structure of the fuel/oil/hydrocarbons has been broken down several things have occurred, the adhesion properties of the fuel/oil/hydrocarbons has been eliminated, the toxicity to the environment has been reduced or eliminated, the fuel/oil/hydrocarbons, are caused to lift out of the pores of the concrete/asphalt/steel surface and float on top of these structures, making it easy to wash the effluent.

**H. Importantly, the flammability** of the fuel/oil/hydrocarbons will have been eliminated as well, so wherever the effluent may flow to or be washed to there will be no flammability problem.

E. While the first actions of OSE II are taking place the multiple enzymes in OSE II will attach themselves readily to the fuel/oil/hydrocarbons, and act as catalyst to speed up the reactions to break down the molecular structure of the fuel/oil/hydrocarbons, as well.

### **VIII. Effluent Handling:**

**Note: wait at least 30 minutes to decant the contaminant, to give the circulation pump to mix the OSE II and water completely with the fuel oil/hydrocarbons, and to give the aeration time to saturate the entire effluent.**

**Note: When the effluent/contaminant is in the process of being extracted from the fuel tank, once you have a thin layer of effluent contaminant start applying, 5 gallons or 20 liters of OSE II mixed 50 to one in an on board container to be sprayed by hand sprayer, or educted at 2% to the fuel tanks bottom while you are removing the effluent/contaminant so you will leave an effluent/contaminant/oil residue free bottom surface of the tank**

There are several means to handle the effluent when you have applied OSE II to a containerized contaminant/fuel/oil/hydrocarbons, that have had OSE II applied to them.

a. First you can collect and store in an empty plastic or steel container on board or onshore, where if you add aeration and circulation with a pump, in 21 to 30 days, the fuel/oil/hydrocarbons will be fully converted to CO<sub>2</sub> and water and you can pour the effluent overboard, or pour into the bilge or discharge to land for high mineral water for plants or grass since there will be no hydrocarbons or hazardous contaminant. OSE II would also help reduce the contaminants in the Bilge, for small or large vessels as well, see link <http://www.osei.us/photoalbums/bilge-water-clean-up>



b. The effluent contaminant, could be directly decanted into the bilge collection areas.

c. The effluent contaminant, can be directly washed overboard, since there will be no sheen and the toxicity of the fuel/oil/hydrocarbons have been detoxified and will have no environmental impact.

d. The contaminant can be decanted to onshore tanks, where it can be aerated, and circulated for generally 21 to 30 days, where the effluent/fuel/hydrocarbons will be converted to CO<sub>2</sub> and water leaving non potable water that can be discharged virtually anywhere.

Steven Pedigo

CEO OSEI Corporation