

Compensated Fuel Ballast Discharge Summary

Description of Discharge

How is this discharge generated? This intermittent discharge is composed of the seawater taken into, and discharged from, tanks designed to hold both fuel and ballast water to maintain the stability of the vessel.

Compensated fuel ballast systems are configured as a series of fuel tanks that automatically draw in seawater to replace fuel as it is consumed. Keeping the fuel tanks full in this manner enhances the stability of a vessel by using the weight of the seawater to compensate for the mass of ballast lost through fuel consumption. During refueling, fuel displaces the seawater, and the displaced seawater is discharged overboard.

Which vessels generate this discharge? Compensated fuel ballast is discharged by approximately 165 Navy surface vessels and submarines

How often and where is this discharge generated? In most cases, surface ships with compensated fuel ballast systems discharge directly to surface waters each time they refuel. However, in some situations that discharge is collected for processing on shore. Surface vessels are refueled both in port and at sea. All at-sea refueling is accomplished beyond 12 n.m. from shore. For submarines, refueling occurs only in port and the compensated ballast is transferred to shore facilities for processing.

Analysis

Nature of Discharge: The compensated fuel ballast discharge can contain 2-propenal, phosphorus, thallium, oil (and its constituents, such as benzene, phenol, and toluene), copper, mercury (a bioaccumulative chemical of concern), nickel, silver, and zinc. Concentrations of 2-propenal, benzene, copper, nickel, phosphorus, silver, thallium, and zinc can exceed acute Federal criteria or State acute water quality criteria. The compensated fuel ballast discharge can also contain nitrogen (in the form of ammonia, nitrates and nitrites, and total Kjeldahl nitrogen) in concentrations exceeding the most stringent State water quality criteria.

Constituent	Concentration	Annual Mass Loading (lbs)
Classicals		
(mg/L)		
Total Phosphorus	BDL - .34	15
Ammonia as nitrogen	0.19 - 0.3	65
Total Nitrogen ^A	.28 - .58	97
Metals		
(µg/L)		
<i>Copper</i>		
Total	43.7 - 86	13
<i>Nickel</i>		
Dissolved	137 - 263.5	46
Total	144 - 267.5	47
<i>Silver</i>		
Dissolved	BDL - 5.68	1
<i>Zinc</i>		
Dissolved	173 - 4330	305
Total	3840 - 4845	1063
Organics		
(µg/L)		
Acrolein	BDL - 203	10.3
Benzene	31 - 153	22

^A Total nitrogen is the sum of nitrate/nitrite and total Kjeldahl nitrogen.

Compensated Fuel Ballast Discharge Summary (continued)

Discussion and Discharge Determination

Discussion: To reduce the discharge of fuel in compensated fuel ballast discharge, the Navy has instituted operational guidelines intended to reduce the potential for overfilling tanks or discharging excessive amounts of fuel entrained in the displaced compensating water while refueling surface vessels. These guidelines limit the amount of fuel that can be taken on in port (i.e., to prevent “topping off” the fuel tanks) and establish maximum allowable rates for in port refueling. Additionally, submarines transfer all compensated fuel ballast water to shore facilities when refueling diesel fuel oil tanks. These operational controls for surface vessel refueling and the practice of transferring the discharge to shore for submarines demonstrates the availability of MPCDs to mitigate potential adverse environmental impacts.

Determination: A marine pollution control device is required.