

Seawater Cooling Overboard Discharge Discharge Summary

Description of Discharge

How is this discharge generated? This discharge consists of seawater from a dedicated system that provides noncontact cooling water for other vessel systems. The seawater cooling system continuously provides cooling water to heat exchangers, removing heat from main propulsion machinery, electrical generating plants, and other auxiliary equipment. The heated seawater is discharged directly overboard.

Which vessels generate this discharge? With the exception of some small, non-self-propelled vessels and service craft, all Armed Forces vessels discharge seawater from cooling systems.

How often and where is this discharge generated? Typically, the demand for seawater cooling is continuous and occurs both within and beyond 12 n.m. from shore.

Analysis

Nature of Discharge: Seawater cooling overboard discharge contains trace materials from seawater cooling system pipes, valves, seachests, pumps, and heat exchangers. Pollutants detected in seawater cooling overboard discharge include copper, zinc, nickel, arsenic, chromium, lead, and nitrogen (in the form of ammonia, nitrates and nitrites, and total Kjeldahl nitrogen). Copper, nickel, and silver were detected in concentrations exceeding both the chronic Federal criteria and State chronic water quality criteria. Nitrogen was detected in concentrations exceeding State chronic water quality criteria. These concentrations contribute to a significant total mass released by this discharge due to the large volume of cooling water. The following table lists the concentrations of the discharge's constituents and the resulting annual fleet-wide mass loading, only for those constituents that are expected to exceed chronic Federal criteria or State water quality criteria.

Constituent	Concentration ($\mu\text{g/L}$)	Annual Mass Loading (lbs)
Classicals		
Ammonia as nitrogen	BDL - 240	65010
Nitrate/Nitrite	BDL - 1710	65010
Total Nitrogen ^A		390058
Metals		
<i>Copper</i>		
Dissolved	11.9 - 1,040	99700
Total	7.55 - 1,135	112100
<i>Nickel</i>		
Dissolved	BDL - 96.4	50100
Total	BDL - 95.0	63700
<i>Silver</i>		
Total	BDL - 5.9	9000

BDL = below detection limit

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

In addition, thermal effects modeling indicates that some vessels may exceed State thermal mixing zone requirements. The seawater cooling water system has a low potential for transporting nonindigenous species, because the residence time for most portions of the system are short. However, a strainer plate is used to minimize the inflow of larger biota during system operation. The strainer plate is periodically cleaned using low pressure air or steam to dislodge any accumulated material. This procedure may result in releasing biota that have attached to the plate.

Seawater Cooling Overboard Discharge Discharge Summary (continued)

Discussion and Discharge Determination

Discussion: A potential MPCD option for achieving pollutant reductions is the use of alternative piping systems (i.e., different metallurgy) that provide lower rates of pipe wall corrosion and erosion. The potential substitution of materials demonstrates the availability of controls to mitigate potential adverse impacts on the environment.

Determination: A marine pollution control device is required.