

## Hull Coating Leachate Discharge Summary

### Description of Discharge

**How is this discharge generated?** This discharge consists of constituents that leach, dissolve, ablate, or erode from hull paints into the surrounding seawater. Vessel hulls that are continuously exposed to seawater are typically coated with a base anti-corrosive coating covered by an anti-fouling coating. This coating system prevents corrosion of the underwater hull structure and, through leaching action releases antifouling compounds. Ablative coatings allow the paint surface to erode or dissolve to release antifouling compounds. These compounds inhibit the adhesion of biological growth to the hull surface.

**Which vessels generate this discharge?** The coatings on most vessels of the Armed Forces are either copper- or tributyl tin (TBT)-based, with copper-based ablatives being the most predominant coating system. The Armed Forces have been phasing out the use of TBT paints, and currently it is found only on approximately 10-20 percent of small boats and craft with aluminum hulls. Small boats and craft that spend most of their time out of water typically do not receive an anti-corrosive or anti-fouling coating.

**How often and where is this discharge generated?** Hull coating leachate is generated continuously whenever a vessel hull is exposed to water, within and beyond 12 n.m. from shore.

### Analysis

**Nature of Discharge:** Priority pollutants expected to be present in this discharge include copper and zinc. TBT is also expected to be present in this discharge for those vessels with TBT paint. The release rate of the constituents in hull coating leachate varies with the type of paint used, water temperature, vessel speed, and the age of the coating. Using average release rates derived from laboratory tests, the wetted surface area of each vessel, and the number of days the vessel is located within 12 n.m., EPA and DoD estimated the mass of copper, zinc, and TBT released in the leachate and concluded that the discharge has the potential to cause an adverse environmental effect. The following table lists the concentrations of copper and TBT in the hull coating leachate and the resulting annual fleet-wide mass loading that is expected to exceed chronic Federal criteria and State chronic water quality criteria.

Constituent	Concentration ( $\mu\text{g/L}$ )	Annual Mass Loading (lbs)
Copper	0.19 - 3.0	216657
Tributyltin	0.00002 - 0.003	24

### Discussion and Discharge Determination

**Discussion:** Annual releases of TBT are expected to decrease since TBT coatings are being phased out by DoD and the Coast Guard. Both DoD and the commercial industry have conducted research on the use of advanced antifouling coatings such as easy release coatings (e.g., silicone) that resist biofouling when the vessel is in motion and a critical speed is reached. The combination of phasing out TBT paints, the potential to establish limits on copper release rates for copper-based coating systems, and the potential for alternative coating systems to reduce copper discharges demonstrates the availability of controls to mitigate potential environmental impacts from hull coating leachate.

**Determination:** A marine pollution control device is required.