Underwater Ship Husbandry
Discharge Summary

Description of Discharge

How is this discharge generated? The underwater ship husbandry discharge is composed of materials discharged during the inspection, maintenance, cleaning, and repair of hulls and hull appendages performed while the vessel is waterborne. Underwater ship husbandry includes activities such as hull cleaning, fiberglass repair, welding, sonar dome repair, propulsor lay-up, non-destructive testing, masker belt repairs, and painting operations.

Which vessels generate this discharge? Underwater ship husbandry discharge is created occasionally by all Navy surface ships and submarines, and some Coast Guard vessels.

How often and where is this discharge generated? Ship husbandry operations are normally conducted pierside.

Analysis

Nature of Discharge: With the exception of underwater hull cleaning and propulsor (i.e., propeller) lay-up, other ship husbandry discharges have a low potential for causing an adverse environmental effect. Underwater hull cleaning is conducted by divers using a mechanical brush system. Copper and zinc are released during cleaning in concentrations that exceed acute Federal criteria and State acute water quality criteria and produce a significant mass loading of constituents. The copper and zinc in this discharge originate from the anti-fouling and anticorrosive hull coatings applied to vessels. The following table lists the concentrations of the discharge's constituents and the resulting annual fleet-wide mass loading for those constituents that are expected to exceed acute Federal criteria and State acute water quality criteria.

Constituent	Concentration (µg/L)	Annual Mass Loading (lbs)
Copper	1,600 - 2,600	4,279
Zinc	780	1,712

Data from commercial vessels indicate that underwater hull cleaning also has the potential to transfer nonindigenous aquatic species. Propulsor lay-up requires the placement of a vinyl cover over the propulsor to reduce fouling of the propulsor when the vessel is in port for extended periods. Chlorine-produced oxidants are generated from impressed current cathodic protection systems and can build up within the cover to levels exceeding State water quality criteria. However, discharges from this operation, as well as other ship husbandry operations (excluding hull cleaning) are infrequent and small in terms of volume or mass loading.

Discussion and Discharge Determination

Discussion: The Navy has established policies to minimize the number of hull cleanings, based on the degree to which biological fouling has occurred. In addition, the Navy has established procedures to use the least abrasive cleaning equipment necessary as a means for reducing the mass of copper and zinc in the discharge. These practices represent available controls to mitigate adverse impacts from underwater ship husbandry operations.

Determination: A marine pollution control device is required.