Seawater Piping Biofouling Prevention
Discharge Summary

Description of Discharge

How is this discharge generated? This discharge consists of the additives used to prevent the growth and attachment of biofouling organisms in seawater cooling systems on selected vessels, as well as the reaction byproducts resulting from the use of these additives. Fouling reduces seawater flow and heat transfer efficiency. Aboard some vessels, active biofouling control systems are used to control biological fouling of surfaces within the seawater cooling systems. Generally, these active biofouling control systems are used when the cooling system piping does not have inherent antifouling properties (e.g., titanium piping). The most common seawater piping biofouling prevention systems include chlorination, chemical dosing, and anodic biofouling control systems. All three systems act to prevent fouling organisms from adhering to and growing on interior piping and components. Chlorinators use electric current to generate chlorine and chlorine-produced oxidants from seawater. Anodic biofouling control systems use electric current to accelerate the dissolving of an anode to release metal ions into the piping system. Chemical dosing uses an alcohol-based chemical dispersant that is intermittently injected into the seawater system.

Which vessels generate this discharge? Twenty-nine Armed Forces vessels use active seawater piping biofouling control systems. Nine vessels use onboard chlorinators, 19 vessels use anodic biofouling control systems, and one vessel employs chemical dosing.

How often and where is this discharge generated? Chlorinators operate on a preset schedule of intermittent operation, a few hours daily. Chemical dispersant dosing is performed for one hour every three days. Anodic systems normally operate continuously.

Analysis

Nature of Discharge: Seawater discharged from systems with active biofouling control systems is likely to contain residuals from the fouling control agent (chlorine, alcohol-based chemical additives, or copper), in addition to constituents normally found in cooling water. Based on modeling of the discharge plume, EPA and DoD estimate that receiving water concentrations of residual chlorine could exceed chronic Federal criteria and State chronic water quality criteria. Because of the large volume of seawater discharged from these systems, the resulting mass loading of chlorine released to the environment is considered significant. The following table lists the concentration of the constituent and the resulting annual fleet-wide mass loading for the constituent that could exceed chronic State water quality criteria.

Constituent	Concentration (μg/L)	Annual Mass Loading (lbs)
Chlorine Produced Oxidants	100	2,538

Discussion and Discharge Determination

Discussion: Existing operational controls that limit the residual chlorine discharged to the environment demonstrate the availability of an MPCD to mitigate the potential for adverse impacts from this discharge.

Determination: A marine pollution control device is required.