

Submarine Emergency Diesel Engine Wet Exhaust Discharge Summary

Description of Discharge

How is this discharge generated? This discharge is seawater that is mixed and discharged with exhaust gases from the submarine emergency diesel engine for the purpose of cooling the exhaust and quieting the engine.

Submarines are equipped with an emergency diesel engine that is also used in a variety of non-emergency situations routine maintenance, and readiness checks. This wet exhaust discharge is generated by injecting seawater (or harbor water) as a cooling stream into the diesel engine exhaust system. The cooling water mixes with and cools the hot exhaust gases, and is discharged primarily as a mist that disperses in the air before depositing on the surface of the water body.

Which vessels generate this discharge? All submarines generate this discharge.

How often and where is this discharge generated? Diesel engines must be operated for equipment checks that occur prior to submarine deployment, monthly availability assurance, and periodic trend analyses. On average, each submarine will operate the diesel engine for approximately 60 hours/year while within 12 n.m. from shore. Most of the operating time (54 hours/year) occurs while the submarine is pierside.

Analysis

Nature of Discharge: Typical constituents of diesel engine exhaust include various hydrocarbon combustion by-products, measured as volatile and semi-volatile organic compounds. The priority pollutants expected to be present in the discharge include polycyclic aromatic hydrocarbons (PAHs), toluene, and possibly metals. The following table lists the concentrations of the constituents and the resulting annual fleet-wide mass loadings for those constituents may exceed State water quality criteria.

Constituent	Concentration (µg/L)	Annual Mass Loading (lbs)
Acenaphthylene	0.0005	0.00001
Phenanthrene	0.134	0.00378
Benzo(a)anthracene	0.04	0.00113
Chrysene	0.109	0.00308
Benzo(b)fluoranthene	0.007	0.0002
Benzo(k)fluoranthene	0.0004	0.00001
Benzo(a)pyrene	0.012	0.00035
Indeno(1,2,3-cd) pyrene	0.45	0.01272
Dibenzo (a,h) anthracene	0.352	0.00995
Benzo(g,h,i) perylene	0.78	0.02204

Discussion and Discharge Determination

Discussion: Although no individual pollutant exceeds water quality criteria, the total concentration of PAHs in the discharge is predicted to exceed State acute water quality criteria. Nevertheless, the discharge of PAHs is unlikely to cause adverse impacts on the marine environment because the total fleetwide annual mass loading of PAHs is calculated to be less than 0.06 pounds per year. Therefore, EPA and DOD determined that it is not reasonable and practicable to require a MPCD to mitigate adverse impacts on the marine environment for submarine diesel engine wet exhaust.

Determination: A marine pollution control device is not required.