

Small Boat Engine Wet Exhaust Discharge Summary

Description of Discharge

How is this discharge generated? This discharge is the seawater that is mixed and discharged with small boat propulsion engine exhaust gases to cool the exhaust and quiet the engine. Small boats are powered by either inboard or outboard engines. Seawater is injected into the exhaust of these engines for cooling and to quiet engine operation. Constituents from the engine exhaust are transferred to the injected seawater and discharged overboard as wet exhaust.

Which vessels generate this discharge? Most small boats with engines generate this discharge. The majority of inboard engines used on small boats are two-stroke engines that use diesel fuel. The majority of outboard engines are two-stroke engines that use a gasoline-oil mixture for fuel.

How often and where is this discharge generated? This discharge is generated when operating small boats. Due to their limited range and mission, small boats spend the majority of their operating time within 12 n.m. from shore.

Analysis

Nature of Discharge: Wet exhaust from outboard engines contains several constituents that can exceed acute Federal criteria or State acute water quality criteria including benzene, toluene, ethylbenzene, and naphthalene. Wet exhaust from inboard engines can contain benzene, ethylbenzene, and total polycyclic aromatic hydrocarbons (PAHs) that can exceed State water quality criteria. Mass loadings of these wet exhaust constituents are considered large. The following table lists the concentrations of the discharge's constituents and the resulting annual fleet-wide mass loading for those constituents that can exceed acute State acute water quality criteria.

Constituent	Concentration ($\mu\text{g/L}$)	Annual Mass Loading (lbs)
<i>Outboard Engines</i>		
<i>Two-Stroke</i>		
Benzene	22,930	185,600
Toluene	69,620	562,500
Ethylbenzene	16,380	132,600
Naphthalene	11,470	92,800
<i>Inboard Engines</i>		
Acenaphthylene	2.16E-03	0.186
Phenanthrene	8.17E-01	70.3
Chrysene	2.13E-01	18.3
Benzo(a)pyrene	7.69E-02	6.61
Benzo(a)anthracene	9.18E-01	79.0
Benzo(b)fluoranthene	5.28E-03	0.454
Benzo(k)fluoranthene	2.49E-03	0.214
Indeno(1,2,3-cd) pyrene	3.45	297.0
Dibenzo(a,h) anthracene	5.05	434.0
Benzo(g,h,i) perylene	5.80	499.0
TOTAL PAHs (Inboard Engines)	16.30	1405.06

Small Boat Engine Wet Exhaust Discharge Summary (continued)

Discussion and Discharge Determination

Discussion: Potential MPCD options include replacing existing outboard engines with new reduced-emission outboard engines, and ensuring all new boats and craft have inboard engines with dry exhaust systems. Therefore, EPA and DOD have determined that it is reasonable and practicable to require use of a MPCD for small boat engine wet exhaust.

Determination: A marine pollution control device is required.