

Annual Net Benzene Levels at Fencelines of Refineries that Exceeded EPA's Action Level (9 micrograms per cubic meter)

Refinery	Annual Average Net Benzene Levels (micrograms per cubic meter)			
	2018	2019	2020	2021
Marathon Galveston Bay Texas City (TX)**	8.6	12.0	15.1	19.8
Philadelphia Energy Solutions (PA)	18.8	49.5	27.4	18.5
Total Refinery Port Arthur (TX)	27.3	16.7	16.6	17.7
Valero St Charles Norco (LA)	2.6	2.7	3.0	14.1
Shell Norco Manufacturing Complex (LA)	8.3	8.5	14.4	13.9
Chalmette Refining (LA)	14.1	15.0	11.2	11.9
Countrymark Refining and Logistics (IN)	4.5	5.3	5.8	11.5
Pasadena Refining (TX)**	14.5	30.0	7.0	11.0
Phillips 66 Lake Charles Westlake (LA)	5.1	6.2	10.8	10.5
Flint Hills Resources Corpus Christi East Refinery (TX)	14.8	13.7	6.7	10.4
Houston Refining LP (TX)**	1.9	5.4	8.6	9.7
Limetree Bay Terminals Christianstead (VI)*		2.9	3.6	9.4

Notes: EPA established an action level of 9 micrograms per cubic meter which, when exceeded, requires refineries to conduct a root cause analysis and take corrective action to reduce benzene emissions.

Compliance with the regulation is determined by calculating an annual average of net benzene concentrations. The net benzene concentration is the difference between the highest and lowest concentrations (representing “background” benzene levels) detected by the refinery’s fenceline network during a two-week monitoring period. If this net annual average exceeds 9 micrograms per cubic, the owner of the refinery must take action. The regulations also allow refineries with site-specific monitoring plans (SSMPs) approved by EPA to make further downward adjustments to exclude benzene that comes from specific sources, including plants outside the refinery’s boundary and certain sources within the refinery that are exempt from the regulation (such as benzene storage tanks).

Source: Benzene fenceline concentrations as submitted by industry to EPA.

*The Limetree Bay refinery did not start monitoring fenceline benzene concentrations until 2019.

**These refineries have site-specific monitoring plans (SSMPs).