

Valero Energy Ltd - Pembroke Refinery

Permit Number : EPR/YP3930EX

Reporting year : 2021

A review of the results of the monitoring and assessment carried out in accordance with the permit [Condition 4.2.2(a)]

Releases to Air

Substance	CAS No.	Reporting Threshold	Annual Total (kg)		Comment
			2020	2021	
Ammonia	7664-41-7	1,000 kg	2,825	2,219	Emission decreased from previous year due to reduced sour water throughput
Carbon dioxide	124-38-9	10,000,000 kg	1,731,973,010	1,583,182,723	Emission decreased from previous year due to reduced refinery throughput
Carbon monoxide	630-08-0	100,000 kg	198,619	123,026	Emission decreased from previous year due to more typical non-LCP (annual periodic monitoring) contribution
Benzene	71-43-2	1,000 kg	12,591	6,198	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Butadiene	106-99-0	100 kg	5,342	3,281	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Butene - All isomers	25167-67-3	1,000 kg	106,831	33,908	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Ethylene (Ethene)	74-85-1	1,000 kg	3,815	2,917	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
1-Hexene	592-41-6	10 kg	30,523	8,386	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Methane	74-82-8	10,000 kg	83,176	60,477	Emission decreased from previous year due to reduced refinery throughput
Pentene - All isomers	109-66-0	100 kg	252,198	467,422	Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Propylene	115-07-1	10,000 kg	39,299	24,428	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Toluene	108-88-3	100 kg	39,299	33,179	Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Xylene - All isomers	1330-20-7	1,000 kg	39,299	45,575	Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission.
Antimony	7440-36-0	1 kg	100	381	Mass fraction derived from FCCU catalyst monitoring increased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission.
Copper	7440-50-8	10 kg	4	14	Mass fraction derived from FCCU catalyst monitoring increased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission.
Nickel	7440-02-0	10 kg	350	1,027	Mass fraction derived from FCCU catalyst monitoring increased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission.
Vanadium	7440-62-2	10 kg	277	530	Mass fraction derived from FCCU catalyst monitoring increased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission.
Particulate matter - PM2.5		1,000 kg	122,696	349,976	Emission increase under investigation
Particulate matter - PM10		1,000 kg	145,564	420,063	Emission increase under investigation
Particulate matter		10,000 kg	149,599	432,431	Emission increase under investigation
Sulphur oxides		100,000 kg	1,696,502	2,270,986	FCCU sour water stripper overheads flaring increased from previous year
Other individual acid-forming gases		1,000 kg	1,231	1,896	FCCU sour water stripper overheads flaring increased from previous year

Releases to Controlled Waters

Substance	CAS No.	Reporting Threshold	Annual Total (kg)		Comment
			2020	2021	
Ammonia	7664-41-7	10 kg	10,299	6,216	Flow weighted average decreased from previous year due to reduced refinery throughput. Nine months below limit of detection.
Chromium	7440-47-3	20 kg	10	82	Flow weighted average increased from previous year due to increased (periodic monitoring) contribution in September and December
Copper	7440-50-8	20 kg	21	35	Flow weighted average increased from previous year to typical emission
Nickel	7440-02-0	20 kg	18	114	Flow weighted average increased from previous year
Zinc	7440-66-6	100 kg	139	252	Flow weighted average increased from previous year to typical emission
Nitrogen		50,000 kg	8,482	27,935	Monitoring methodology amended to ISO 11905-1
Phenols		20 kg	1,634	963	Flow weighted average decreased from previous year due to reduced FCCU throughput
Total organic carbon		50,000 kg	230,017	67,499	Flow weighted average decreased from previous year due to reduced refinery throughput. TOC emission factor amended to align with PRTR (COD/3).

Waste Releases

Waste	EWC Code	WFD Code	Annual Total (kg)		Comment
			2020	2021	
Hazardous waste transferred for disposal	05 01 11*	D9	8,498	5,885	Fluoridic caustic reduced from previous year due to reduced Alkylation Unit throughput
Hazardous waste transferred for recovery	05 01 06*	R13	539	3,046	WWTP de-sludging activities carried out in current year